**Supplement to the Final Supplemental Environmental Impact Statement for the International Boundary and Water Commission International Wastewater Treatment Plant - Interim Operation**
**October 1998**

The South Bay Ocean Outfall (SBOO) is currently under construction and will be completed in December 1998. When completed, the SBOO will enable the South Bay International Wastewater Treatment Plant to be in full operation. The purpose of the project is to provide new wastewater control facilities to safeguard the public health, environment, public beaches, water quality, and economy of San Diego, California and Tijuana, Baja California, Mexico. In conjunction with actions taken by Mexico, this project would minimize dry-weather flows of untreated sewage from the municipality of Tijuana, Baja California, Mexico, into the United States. Currently, such flows cause chronic and substantial pollution in the Tijuana River valley, National Estuarine Research Reserve, and areas used for agriculture and public recreation and designated as critical habitat for federal and state listed endangered species.

In May 1994, EPA and the International Boundary and Water Commission, U.S. Section (USIBWC) completed a Final Environmental Impact Statement (EIS) and Record of Decision (ROD) for the SBIWTP and SBOO project. In the 1994 ROD, the federal agencies decided to build a secondary wastewater treatment facility and ocean outfall. The 1994 EIS and ROD was supplemented in 1996 by the Final Interim Operation Supplemental Environmental Impact Statement (SEIS). The ROD for the 1996 SEIS examined the effects of discharging advanced primary effluent through the SBOO until alternatives to secondary treatment were evaluated. It was concluded that the SBIWTP should be operated as an advanced primary treatment plant on an interim basis until a secondary component was completed. The decision to operate the SBIWTP was made due to the dry-weather flows of sewage which would continue to pollute the river, estuary, and coastal waters in the U.S. without the interim operation of the SBIWTP and SBOO.

Initial testing of the South Bay International Wastewater Treatment Plant (SBIWTP) began in April 1997. The SBIWTP effluent quality has been monitored monthly and compared to discharge limits set forth in the NPDES permit. Monitoring of the effluent shows regular non-compliance with the acute toxicity limits. The monitoring has also shown that dioxin has occasionally exceeded the limits set by the California Ocean Plan. The impacts to the environment from dioxin and acute toxicity were not addressed in the 1996 Draft and Final Interim Operation SEIS for the SBIWTP. The alternatives considered in the 1996 SEIS must be re-evaluated based on this new information on acute toxicity and dioxin. This Supplement to the 1996 SEIS will examine the impacts of the new information on the alternatives considered.

In order to utilize the SBOO when it becomes available in December, EPA and USIBWC obtained a waiver from EPA's NEPA regulations (40 CFR 6.404) which requires a supplement to be prepared in accordance with the procedures for an EIS. These procedures require circulation of a draft SEIS for 45 days and a final SEIS for 30 days. In lieu of those procedures, the agencies proposed to prepare this Supplement to update the 1996 SEIS on impacts from acute toxicity and dioxin, notice the Supplement in the Federal Register; and circulate the Supplement for a 30 day public comment period. At the end of the comment period, the lead agencies would issue a revised Record of Decision that would reevaluate the decision to operate the SBIWTP and discharge through the SBOO. The Council on Environmental Quality was consulted on these procedures.

**Lead Agencies: U.S. Environmental Protection Agency, Region IX**
**International Boundary and Water Commission, U.S. Section**

**Technical Preparation: U.S. Army Corps of Engineers**

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## 1.0 Purpose and Need for the Proposed Action

### 1.1 Project Summary

Construction of the South Bay Ocean Outfall (SBOO) will be completed in December of this year. Once SBOO is complete, the South Bay International Wastewater Treatment Plant (SBIWTP) will operate and treat 25 mgd with release to the outfall. The purpose of the project is to provide new wastewater control facilities to safeguard the public health, environment, public beaches, water quality, and economy of San Diego, California and Tijuana, Baja California, Mexico. In conjunction with actions taken by Mexico, this project would minimize dry-weather flows of untreated sewage from the municipality of Tijuana, Baja California, Mexico, into the United States. Currently, such flows cause chronic and substantial pollution in the Tijuana River valley, National Estuarine Research Reserve, and areas used for agriculture and public recreation and designated as critical habitat for federal and state listed endangered species.

### 1.2 Project Background

In May 1994, EPA and USIBWC completed a Final Environmental Impact Statement (EIS) and Record of Decision (ROD) for the SBIWTP and SBOO project. In the 1994 ROD, the federal agencies decided to build a secondary wastewater treatment facility and ocean outfall. The 1994 EIS and ROD were supplemented in 1996 by the Final Interim Operation Supplemental Environmental Impact Statement (SEIS). The ROD for the 1996 SEIS examined the effects of discharging advanced primary effluent through the SBOO until secondary treatment facilities for the SBIWTP are constructed. The EIS and ROD concluded that the SBIWTP should be operated as an advanced primary treatment plant on an interim basis. The decision to operate the SBIWTP was made due to the dry-weather flows of sewage which would continue to pollute the river, estuary, and coastal waters in the U.S. without the interim operation of the SBIWTP and SBOO.

In January 1998, EPA and USIBWC issued the Draft Long Term Treatment Options SEIS which evaluated various treatment options for the SBIWTP. The Final Long Term Treatment Options SEIS is estimated to be completed in the spring of 1999.

The SBIWTP began testing in April 1997. Treated effluent of up to 13 mgd has been discharged through the emergency connection to the city of San Diego's Point Loma treatment plant. When the plant has been operational, influent and effluent quality has been analyzed monthly and compared to discharge limits set forth in its NPDES permit. This analysis identified new information on the quality of the SBIWTP's effluent, specifically, information on acute toxicity and dioxin. Since the new information presents potentially significant impacts not considered in the 1996 Draft and Final Interim Operation SEIS, a re-evaluation of the alternatives must be completed.

This NEPA document supplements the 1996 Final Interim Operation SEIS for the SBIWTP with the new information on acute toxicity and dioxin present in the advanced primary effluent. The alternatives and the impacts to the environment from the new information are fully discussed in this supplement. Additional information is also available in the 1996 Final SEIS. Pursuant to 40 CFR Section 1502.21 (as of July 1, 1986), the 1996 Draft and Final Interim Operation SEIS is hereby incorporated by reference.

#### 1.2.1 Project Setting

The South Bay International Wastewater Treatment Plant and Ocean Outfall facilities are located within the Tijuana River valley in San Diego, California (Figures 1 and 2). The Tijuana River is an ephemeral stream within a watershed draining areas of the United States and Mexico. The majority of the watershed is sparsely populated rural lands of natural open space or rural residential and agricultural uses; however, the metropolitan city of Tijuana and the city of Tecate are both within the drainage area in Mexico. The Tijuana River flows northward through a 2.7 mile (4.3 km)

concrete flood-control channel in the city of Tijuana and crosses the international boundary into California. After the river crosses into the U.S., it continues westward approximately 5.3 miles (6.9 km) and empties into the Pacific Ocean about 1.5 miles (2.4 km) north of the international boundary. The South Bay oceanographic region is characterized as a coastal bight with near shore shallow sandy bottom conditions. The Imperial Beach kelp bed is located north of the Tijuana River estuary.

Historically, the Tijuana River was an ephemeral stream characterized by low or no flow for many months of a given year. Brief periods of very high flows, primarily during the rainy season, are typically followed by low or no summer flows. As discussed in the 1996 SEIS, varying volumes of sewage flows have occurred over the years in the river both during the rainy and dry season. The Tijuana River can be characterized as a braided alluvial stream that shifts widely across the valley floor during flood events. In the United States, the existing vegetation along the riparian corridor in the lower Tijuana River valley is composed primarily of various species of willow with varied herbaceous species and mulefat. The upland areas of the river valley are primarily ruderal disturbed vegetation or active agriculture and coastal sage scrub. The sparsely populated Tijuana River valley is predominantly natural open space with privately held lands in agricultural, ranching, and extractive uses. South of the estuary along the shoreline is a public coastal recreation area, Border Field State Park, and to the north is Imperial Beach Naval Air Station and the city of Imperial Beach. The remainder of the valley is designated by the County as part of the Tijuana River Valley Regional Open Space Park. At the west end of the valley, the river braids into a large estuary, federally designated as the Tijuana River National Estuarine Research Reserve. In its natural state, the estuary consisted of approximately 870 acres (352 ha) of intertidal wetlands. Based on 1986 aerial photos, the estuary consists of about 350 acres (141.8 ha) of tidal slough and salt marsh.

The city and county of Tijuana includes an area of 1,381 square miles, with urbanized areas concentrated along the border and both sides of the Tijuana River. In Tijuana, the Tijuana River is almost entirely a concrete channelized system. In 1990, it was estimated there were approximately 161,000 occupied housing units, of which 65 percent were sewered. There were approximately 2,500 industrial plants, including 463 maquiladoras, or twin plants, engaged in the assembly of components from other countries. Manufacturing industries of Tijuana include metal products, machinery, and equipment; chemical substances and petroleum; minerals, paper, and printing; wood and wood products; textiles, clothing, and leather; and food and beverage products. The municipality of Tecate is situated approximately 30 miles to the east within the Tijuana River watershed. As of 1990 Tecate had 120 industrial plants, with mining, agriculture, and cattle raising as the principal activities.

### 1.2.2 Historic and Current Problem of Border Sewage Contamination

The 1996 SEIS extensively details the history of border sewage contamination along the U.S./Mexico border. However, in summary, sewage from Tijuana, Mexico has entered the United States on a periodic basis since the 1930s. The U.S. and Mexico have been working together to solve this problem since that time. Cooperative efforts over the years include construction of trunk sewer lines, a pump station and force main, and a treatment facility at San Antonio de los Buenos. The newest element in addressing the border sewage problem has been the construction of the SBIWTP and SBOO.

The interim use of the SBIWTP and discharge through the emergency connection have aided in reducing dry-weather sewage flows in the Tijuana River. However, as the volume of sewage continues to increase in Tijuana, and Pump Station One in Tijuana reaches capacity, dry-weather sewage flows may occur more frequently in the Tijuana River. Due to the high levels of freshwater in the Tijuana River this summer, raw sewage has been carried though the Tijuana River and estuary, and into the near shore environment, causing periodic beach quarantines in Imperial Beach and Coronado.

### 1.2.3 Current and Planned Border Sewage Facilities

A summary description of U.S. and Mexican sewage treatment facilities and infrastructure is provided below. A more detailed description of these facilities can be found in the 1996 SEIS.

Mexico's Facilities. Sewage in Tijuana is collected at various pump stations, including Pump Station One, and then pumped via force mains to an open canal that traverses south to the San Antonio de los Buenos treatment works. Both treated wastewater and raw sewage which bypass the plant are disposed of at the shoreline 5.6 miles (9 km) south of the international border. The primary components of the system are described herein.

Mexico operates a river diversion structure within the Tijuana River in Mexico. During dry weather, up to 13 mgd (569 LPS) of sewage-contaminated flows is pumped from the concrete, low-flow river channel into Mexico's collection system and to Pump Station One. During the winter months sewage contaminated wet-weather and storm flows pass through to the U.S. Sewage flows collected in the city of Tijuana are conveyed to Pump Station One. From the Pump Station One facility, flows are pumped to the force main and conveyance canal 5.6 miles (9 km) south for treatment at San Antonio de los Buenos. A new parallel conveyance system in Mexico is planned to be completed in the year 2000. Peak flows that exceed the capacity of Tijuana's conveyance canal are sent to the SBIWTP and then routed to the city of San Diego's Point Loma Wastewater Treatment Facility.

The San Antonio de los Buenos treatment facility is designed to treat an average of 17 mgd (745 LPS) average flow and up to 25 mgd (1,095 LPS) peak flow. Treated effluent is conveyed 1.6 miles (2.6 km) south for shoreline discharge. Untreated effluent is also discharged to the shoreline in Mexico.

An emergency connection between Pump Station One and the city of San Diego's sewer system has been in existence since 1966. Historically, the capacity of the emergency connection has been 13 mgd (569 LPS). Flows through the emergency connection are treated at the city of San Diego's Point Loma advanced primary treatment plant and discharged through the ocean outfall. Use of the emergency connection will be discontinued once the SBOO is completed in December 1998, as directed in the 1991 Memorandum of Agreement between the City of San Diego, California and the United States of America. New agreements would be required for continued use of the emergency connection.

United States Facilities. The SBIWTP is designed to treat sewage from Tijuana and, in dry weather, sewage contaminated flows in the river, canyons and gullies, up to a total of 25 mgd [1,095 LPS] (average daily flow). Following treatment, effluent will be discharged through the SBOO into the Pacific Ocean in the U.S. Wastewater flows from Tijuana are conveyed to Tijuana's Pump Station One, and then directed to both the SBIWTP in the United States and San Antonio de los Buenos in Mexico. In case of breakdowns in Pump Station One or the conveyance system, the entire sewage flow could be directed to the SBIWTP on an emergency basis.

Testing of the SBIWTP was initiated in April 1997; interim discharge of SBIWTP effluent has occurred through the city of San Diego's emergency connection. Use of the emergency connection will be discontinued once construction of the SBOO is completed (Appendix D). Ten months of SBIWTP effluent data have been collected between April 1997 and August 1998. Construction of the secondary portion of the SBIWTP will be initiated shortly after completion of the Long Term Treatment Options SEIS, which is scheduled for the spring of 1999.

Sewage-contaminated dry-weather flows that occur in Mexico and run overland in a northerly direction into the United States through Goat Canyon, Smuggler Gulch, Silva Drain, Stewart's Drain, and Canyon del Sol will be captured and transported to the SBIWTP for treatment. Construction of each of these drain structures is substantially complete.

As stated previously, once completed in December 1998, discharge of treated effluent from the SBIWTP will be to the Pacific Ocean through a pipeline consisting of two segments, the SBLO and the SBOO. The SBLO consists of

a 12,300-linear-foot (3.4 km) buried pipeline that runs east west from Dairy Mart Road to the mouth of Goat Canyon. Construction of the SBLO was completed in December 1993. The SBOO will connect to the west end of the SBLO and extend into the Pacific Ocean. The outfall consists of a 13,600 foot(4.1 km) tunnel connected to a 4,670-foot-long (1.4 km) seafloor pipeline connected to a wye-shaped diffuser on the seafloor. The average point of discharge will be 18,700 feet (5.7 km) offshore at a depth of 93 feet (28 m). The outfall is scheduled to be completed in December 1998.

### 1.3 Proposed Action

The proposed action in the 1996 Interim Operation SEIS was to operate the SBIWTP as an advanced primary treatment works in order to minimize the risk of the discharges of raw sewage in the Tijuana River and near shore coastal waters in Mexico. The preferred alternative selected in the 1996 ROD was a phased approach. The first step would be to operate the SBIWTP to detain up to 2.5 million gallons of sewage from Tijuana at the SBIWTP and discharge through the emergency connection to the city of San Diego's Point Loma Wastewater Treatment Facility. As the flows from Tijuana increased, a detention basin of approximately 5.5 million gallons could be considered for storage of treated effluent. If flows in Tijuana exceeded the capacity of Tijuana's conveyance canal and the city of San Diego's emergency connection, treated sewage from the SBIWTP could also be sent back to Mexico via a new conveyance canal. Discharge of 25 mgd would occur once the SBOO is complete. Since the release of the 1996 Interim Operation SEIS and 1997 ROD, the SBIWTP has been operated to treat peak flows from Mexico with discharge through the emergency connection.

The purpose of the Supplement is to analyze and disclose information that has become available since the completion of the 1996 Interim Operation SEIS. Subsequent sewage influent and advanced primary effluent monitoring have indicated the presence of dioxin, which was not originally established in the 1996 SEIS. In addition, analysis of influent and advanced primary effluent from the SBIWTP indicates that both exceed acute toxicity standards. This Supplement addresses the issues of acute toxicity and dioxin in wastewater treated by the SBIWTP.

The proposed action for this Supplement is to operate the SBIWTP as a 25 mgd advanced primary facility and discharge through SBOO. In light of the new information on acute toxicity and dioxin, additional impacts from discharging the advanced primary effluent may occur. However, impacts from Alternative 1 - No Action and Alternative 2 - Operation of the SBIWTP and Discharge to the Tijuana River would have substantially greater environmental and human health impacts to the Tijuana River Valley and coastal zone than the discharge through the SBOO.

In order to utilize the SBOO when it becomes available in December 1998, EPA and USIBWC obtained a deviation (40 CFR 6.106) from EPA’s NEPA regulations (40 CFR 6.404) which requires a supplement to be prepared in accordance with the procedures for an EIS. These procedures require circulation of a draft SEIS for 45 days and a final SEIS for 30 days. In lieu of those procedures, the agencies proposed to prepare this Supplement to update the 1996 SEIS on impacts from acute toxicity and dioxin, notice the Supplement in the Federal Register, and circulate the Supplement for a 30 day public comment period. At the end of the comment period, the lead agencies would issue a revised Record of Decision that would reevaluate the decision to operate the SBIWTP and discharge through the SBOO. The Council on Environmental Quality was consulted on these procedures.

#### 1.3.1 Dioxin

During the preparation of the 1996 SEIS, influent monitoring was conducted by the city of San Diego's Metropolitan Wastewater Department (MWWD) for the EPA and USIBWC. The contract laboratory used by MWWD did not detect dioxin in wastewater entering the emergency connection during the period of January 1995 through August 1996. However, due to a change in NPDES requirements, a new laboratory was contracted by MWWD in order to conduct higher resolution dioxin analysis. This laboratory detected the presence of dioxin in the part per quadrillion range beginning in September 1996.

Based on these data, a new study of the impacts of dioxin in the advanced primary effluent discharge through the ocean outfall was completed (Appendix A). Modeling of effluent concentrations for dioxin was based on sewage influent samples collected from September 1996 through April 1998. Of the 14 months considered from this data set, the advanced primary effluent was predicted to exceed NPDES effluent limits for five months for dioxin, or 36% of the time. From April 1997 to August 1998**,** the SBIWTP was operated for approximately 10 months and dioxin limits in the effluent were actually exceeded three times during this period. Based on this information, an analysis of the effects of dioxin for the interim discharge period is presented in this document.

### 1.3.2 Acute Toxicity

Testing of the SBIWTP was initiated in April 1997. Ten months of effluent data have been collected between April 1997 and August 1998. Although test results have indicated general overall compliance with constituents in the NPDES permit for the SBIWTP, the effluent exceeded the acute toxicity standard as identified in the SBIWTP NPDES permit. Acute toxicity is used to estimate the aggregate toxic effect (i.e., lethality) of an effluent using standardized, freshwater surrogate vertebrates or invertebrates. This toxicity is caused by the presence of a compound or group of compounds in the wastewater that act as toxic stressors to the test organisms. Untreated influent from Tijuana also exhibited high levels of acute toxicity.

## 2.0 Alternatives

Six alternatives were considered in the SBIWTP 1996 Interim Operation SEIS. No additional alternatives are considered in this supplemental document. Impacts from the new data will be considered for Alternatives 1, 2, and 5. Alternatives 3, 4, and 6 are no longer considered feasible options. These alternatives will not be further considered in this Supplement.

### 2.1 Alternative 1: No Action

This alternative assumes the conditions specified in the 1994 ROD: no operation of the SBIWTP until a secondary treatment process has been constructed and discharge of secondary treated effluent through SBOO. Under this alternative, therefore, raw sewage flows in excess of the capacity of Tijuana's Pump Station One and conveyance system would flow into the Tijuana River until secondary treatment is available. The city of San Diego's emergency connection would be discontinued as directed in the 1991 Memorandum of Agreement between the City of San Diego, California and the United States of America (Appendix D). New agreements would be required for continued use of the emergency connection.

The discharge of untreated sewage may have a significant effect on the public health of residents and recreationists in the Tijuana River Valley, as well as on the biology and water quality of the Tijuana Estuary. Raw sewage discharged to the surf zone adjacent to the San Antonio de los Buenos Wastewater Treatment Facility would also continue, since no ocean outfall is present in Mexico.

### 2.2 Alternative 2: Operate the SBIWTP

In the 1996 SEIS, Alternative 2 included a scenario where flows greater than the capacity of the Mexican system would be diverted through the emergency connection. Flows in excess of the emergency connection would be directed to the SBIWTP, treated to advanced primary levels, and discharged to the emergency connection during off-peak periods. This alternative assumed that the SBIWTP would be operational and would provide an in-plant storage capacity of 2.5 million gallons, mainly in the advanced primary sedimentation tanks. If no discharge capacity is otherwise available, the treated effluent would be discharged to the Tijuana River.

Under this alternative, raw sewage flows in excess of Pump Station One in Mexico (up to 25 mgd [1,095 LPS]) would flow to the SBIWTP and would be treated to advanced primary standards. Advanced primary treated effluent would

then be discharged to the Tijuana River. Based on the 1991 Memorandum between the city of San Diego and the United States of America (Appendix D), use of the emergency connection would be discontinued once the SBOO is constructed. New agreements between the city and the U.S. would be required for continued use of the emergency connection. It is anticipated that the effluent would not be chlorinated due to the possible adverse effects to freshwater, estuarine, and aquatic biota. Raw sewage discharged to the surf zone in Mexico at the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue, since no ocean outfall is present.

### 2.3 Alternative 3: Operate SBIWTP with Detention Basin

In the 1996 Interim Operation SEIS, Alternative 3 proposed the construction at the SBIWTP site of a detention basin to store 5.5 million gallons of advanced primary treated effluent. Discharge from the detention basin would occur during off-peak periods to the city of San Diego's emergency connection. Based on flow estimates from Mexico, it was projected that peak flows to the SBIWTP would range from 5 mgd to 9.5 mgd for 1996 to 2001 respectively. However, since the release of the 1996 SEIS, the SBIWTP and the emergency connection have been operated up to a maximum capacity of 13 mgd, the capacity of the emergency connection. Since the capacity of the emergency connection has been maximized, the 5.5 million gallon discharge from the detention basin would not be feasible. Furthermore, the capacity of the emergency connection has been reduced due to new connections to the system on the U.S. side. Finally, use of the city of San Diego's emergency connection may no longer be available based on the 1991 Memorandum of Agreement between the City of San Diego, California and the United States of America. Raw sewage discharged to the surf zone adjacent to the San Antonio de los Buenos Wastewater Treatment Facility would also continue, since no ocean outfall is present. For these reasons, Alternative 3 is no longer considered feasible.

### 2.4 Alternative 4: Operate SBIWTP with New Conveyance to Mexico

Mexico intends to complete additional pumping facilities, a force main, and a conveyance canal parallel to their existing facilities as a backup system. The additional facilities would have capacity of 25 mgd average flow and 50 mgd of peak flow. In the interim period, effluent from the SBIWTP could be conveyed separately to the shoreline discharge point in Mexico using these facilities.

In the 1996 Interim Operation SEIS, Alternative 4 proposed the operation of the SBIWTP with discharge to a new pumping and conveyance system in Mexico. The new system would be constructed to serve as a parallel backup facility for the existing Mexican conveyance system and would convey flows to the San Antonio de los Buenos treatment plant in Mexico. The additional facilities would be a backup and not a stand-alone expansion of the existing Mexican system. Conveyance of flows from the SBIWTP through the new conveyance system would be temporary until the SBOO is available for use.

Since the development of the 1996 SEIS, construction of the new pumping and conveyance system has been delayed. The new estimate for completion of the system is in early 2000, after completion of the SBOO but prior to the completion of secondary facilities. The year 2000 completion date reduces the period that this system would be available to accept advanced primary effluent from the SBIWTP. Mexico has not expressed an interest in receiving the treated effluent, although Mexico does maintain rights to the treated wastewater. The discharge of treated effluent to the new pumping and conveyance system would have significant environmental consequences to water quality in both the U.S. and Mexico. The discharge of treated effluent would occur at the surf zone near the San Antonio de los Buenos treatment plant, since no ocean outfall is present. For these reasons, Alternative 4 was no longer considered feasible.

### 2.5 Alternative 5: Operate SBIWTP with Discharge to SBOO

Under this alternative, an average of 25 mgd (1,095 LPS) of raw sewage from Mexico would be treated to the advanced primary level at the SBIWTP and released to the SBOO for discharge to the ocean. Raw sewage discharge to the surf zone in Mexico at the San Antonio de los Buenos Treatment Facility is expected to be substantially reduced.

## 2.6 Alternative 6: Phased Alternative

The previous alternatives were evaluated as stand-alone alternatives to taking no action through the year 2001. The phased alternative would begin with Alternative 2, operate the SBIWTP to detain up to 2.5 mgd of flows and treat additional flows from eastern Tijuana as needed with discharge to the emergency connection. When it appears that the total average dry-weather flows would result in discharge of treated effluent from the SBIWTP to the Tijuana River then either Alternative 3 or Alternative 4 would be implemented. Either of these two alternatives could provide a means to avoid discharging treated effluent from the SBIWTP into the Tijuana River. When the SBOO is completed, all treated effluent from the SBIWTP would be discharged through the SBOO. As with Alternatives 3 and 4, Alternative 6 is not further considered in this document.

## 2.7 Preferred Alternative

The goal of the preferred alternative remains the same as in the 1996 Interim Operation SEIS. It is to avoid the discharge of untreated sewage and minimize the effects of the discharge of treated effluent to sensitive areas such as the Tijuana River, estuary, shoreline, offshore kelp beds, and active recreation and commercial areas.

The preferred alternative is to discharge through the SBOO once it becomes operational in December 1998. The new information on dioxin and acute toxicity does not offset the benefits from preventing raw sewage or advanced primary effluent discharge to the Tijuana River. Based upon a description of the impacts in Section 4.0 of this Supplement, Alternative 5 is the preferred alternative.

# 3.0 Affected Environment

The affected environment remains the same as described in the 1996 Interim Operation SEIS and is briefly summarized here. Where appropriate, new information is also provided.

## 3.1 Hydrology and Water Quality

Existing conditions remain consistent with the description in the 1996 SEIS. New information on Tijuana River monitoring is also provided here.

Tijuana River Flow. Prior to 1980, the Tijuana River was an ephemeral stream characterized by low or no flow for many months of a given year. Intermittent flood flows were highly variable and were dependent upon rainfall amounts and intensity across the watershed. Brief periods of very high flows, primarily during the rainy season (November through April), were often followed by low or no summer flows. From 1980 to 1991, however, there have been sustained perennial flows of wastewater in the Tijuana River (Zedler et al. 1990; Williams and Swanson 1987). Flow data measured by the USIBWC indicates that from 4.5 mgd (197 lps) to 22 mgd (964 lps) of wastewater flowed into the U.S.; the average wastewater flow was estimated to be 13 mgd (570 lps) in 1990. Since 1991, when Mexico completed construction of a river collector structure to divert up to 13 mgd (570 lps) of sewage-contaminated river flows into its sewage collection system, sewage-contaminated flows have crossed the border only when the river collector was not in operation. This diversion is not operated during storm flows. Estimates of raw sewage in the Tijuana River are 3 mgd (131 lps) in 1993 and 1 mgd (44 lps) in 1995. Urban discharges into the river, such as trash, detergents, oils, fertilizers, and pesticides, also occur.

Water Quality. Until Mexico installed the diversion structure in 1991, approximately 13 mgd (570 lps) of unsewered wastewater flowed into the Tijuana River and concrete flood-control channel in Mexico via gullies and storm drains, which then flowed into the U.S to the Tijuana River estuary. In 1990, a water sampling program of the Tijuana River was initiated by the USIBWC to evaluate the wastewater flows to be treated at the proposed SBIWTP. Water quality samples were taken in two locations, Tijuana Pump Station One in Mexico and the Tijuana River in the U.S.

Subsequent sampling from Tijuana's Pump Station One and the emergency connection to the San Diego sewer system was analyzed by Malcolm Pirnie Engineers (1993) for the SBIWTP concept design. Based on the average measured constituent concentrations, the level of pollutant loading in the Tijuana River at an estimated 10 mgd (438 lps) flow rate was determined. Over 290 pounds (132 kg) of cadmium, 110 pounds (50 kg) of mercury, 2,665 pounds (1,208 kg) of selenium, and almost 1,390 pounds (630 kg) of arsenic were introduced annually into the Tijuana River. Other constituents detected in the river in 1993 include over 765 pounds (347 kg) of lead and approximately 620 pounds (281 kg) of cyanide annually.

New River Monitoring Information. Limited Tijuana River monitoring was conducted between April 1997 and April 1998 as part of the baseline monitoring required by the SBIWTP's NPDES permit. The monitoring included 7 sampling points in the river and estuary for temperature, dissolved oxygen (DO), pH, conductivity, total dissolved solids (TDS), total and fecal coliform, phosphorous, and nitrogen. The results of the monitoring indicated that the temperature in the river ranged from 14.2 to 26 degrees Celsius. The DO ranged from 4.8 to 12.2 mg/l with the lowest readings recorded generally in the river sampling sites. The pH ranged from 6.69 to 8.05, conductivity ranged from 833 us/cm to greater than 2OmS/cm, and TDS ranged from 414 mg/l to greater than 10g/L with the highest readings for all three parameters occurring in the Tijuana estuary. Coliforms ranged from 40 to greater than 1,600,000 MPN/100ml with the lowest readings recorded in the Tijuana estuary. Total phosphate ranged from 0.5 to 5.2 mg/l with the lowest readings in the estuary. Finally, total nitrogen ranged from 6.6 to 13.7 mg/l.

Groundwater in the Tijuana River Valley. Groundwater in the lower Tijuana River valley occurs in three zones: beneath the Nestor Terrace north of the valley, in the alluvial fill underlying the valley, and in the San Diego Formation beneath the alluvium (TJVCWC 1994a). Of these three zones, the Tijuana Valley alluvium is the most studied and utilized.

The unconfined alluvial aquifer is approximately 6.5 miles (10.5 km) long, is 7,000 to 10,000 feet (2,134 to 3,048 m) wide, and has the potential to store about 65,000 acre-feet (80 Mm3) of water. The thickness of the aquifer, which is composed of unconsolidated sands, silts, clays, and gravels, varies from 50 to 75 feet (15.2-22.9 m) in the east to approximately 150 feet (45.7 m) near the Pacific Ocean. At the base of the alluvial aquifer is a layer of coarse sand, gravel, and cobbles (TJVCWD 1994a). Gravel and sand layers are tapped by production water wells at depths of 20 to over 100 feet (6.1-30.5 m).

It is only when the amount of groundwater removed from a basin chronically exceeds natural recharge from rainfall, subsurface inflow, and intermittent flood flows that the groundwater table will begin to trend downward. The record for the lower Tijuana River valley from 1965-1978 shows that once the rate of groundwater extractions is reduced, groundwater levels will recover from storm flows and subsurface inflows into the basin, even during an extended period of drier-than-normal rainfall and less-than-normal runoff, such as occurred from 1965-1978, so long at the natural recharge of groundwater is greater than the extraction rate.

Groundwater Quality. Currently, as in the past, the quality of the groundwater in the Tijuana River valley is characterized by high sodium chloride and high total dissolved solids. These high salinity levels prevent the current use of well water for irrigation of salt-sensitive crops cultivated within the valley. As a result of lowered groundwater levels and seawater intrusion, groundwater TDS concentrations along the coast have exceeded 27,000 milligrams per liter (mg/1) (a standard TDS content generally ranges between 1,000 and 1,500 mg/1). In the Department of Water Resources Bulletin 106-2 (State of California 1967), the Tijuana River valley groundwater was rated generally inferior for domestic use due to its high sulfate and high fluoride concentrations. It was also rated generally inferior for irrigation purposes because of high electrical conductivity, high chloride levels, and high percentage of sodium in the Spooner's Mesa area. In addition to seawater intrusion, the poor quality of the groundwater is also attributed to leakage of sodium chloride from the San Diego formation, irrigation return, and groundwater movement from beyond the international boundary (EPA 1988).

Nevertheless, the Water Quality Control Plan for the San Diego Basin (9) designates municipal and domestic supply,

agricultural supply, and industrial service supply as beneficial uses for the groundwater east of Hollister Street, although the area is exempted from the sources of drinking water policy (State of California 1995). These beneficial uses do not apply west of Hollister Street.

### 3.2 Oceanography

Existing oceanographic conditions remain consistent with the description in the 1996 SEIS and are briefly summarized here. New oceanographic baseline monitoring information is also provided.

Regional and Local Currents. The currents along the California coast are dominated by the offshore, southward-flowing California current. The California current system consists of (1) a broad, southerly flowing surface and near-surface current that flows at the edge of and beyond the continental shelf, (2) a northerly flowing undercurrent that flows under the southerly current, and (3) northerly countercurrents at the surface and near-surface which flow near the coast.

The South Bay region is characterized as a coastal bight and extends from Point Loma to far northern Baja. The coastal currents in this southern coastal region were measured for a 24-month period between 1986 and 1988 for the Tijuana Oceanographic Engineering Study (TOES) (Engineering Science 1988). The mean flow was measured by current meters in 15 stations in U.S. and Mexican waters. These current meter data were augmented by satellite imagery and other studies (drogue release studies).

Modeling of the flow patterns was conducted by Hendricks (1988). The mean flow pattern for the first 12 months was predominately to the south. The principal pattern was found to be a relatively uniform longshore flow north and south along the coastline, representing about 60 to 65% in the variance in current measurements. A second, independent flow pattern consists of a recurring counterclockwise circulation south of Point Loma of varying intensity that can extend 6.2 to 9.3 miles (10 to 15 km) offshore and approximately 10.6 miles (17 km) alongshore. About 87 percent of the variability in current meter data is accounted for by these two patterns.

Ocean Floor Composition. The shore types in the South Bay area are represented by sand beaches, wave-cut rocky platforms, and gravel boulder beaches. The area from the international border north to Zuniga Point, at the entrance to San Diego Bay, a reach of 22 miles (35.6 km), is sandy beach with a shallow sloping sandy shelf. Wave-cut rocky platforms and gravel beaches are found south of the border in Baja.

The South Bay area is comprised almost entirely of medium to coarse-grained sand beach. The only intertidal hard substrate is found 12.9 miles (20.8 km) to the north and consists of the south jetty riprap at Zuniga Point at the mouth of San Diego Bay. A remote-operated vehicle reconnaissance survey of the South Bay outfall area was conducted in May 1990 (Kinnetic Laboratories 1990). Soft bottom habitat characterized the proposed South Bay outfall alignment with a short stretch of cobble bed at about 55 feet (1 6.8 m) depth. Coarse shell debris was observed along the outfall alignment from 50-80 feet (15.3-24.4m**)** deep, with finer sediments inshore and offshore.

Marine Water/Sediment Quality. Regionally, nutrient concentrations in seawater, both dissolved and particulate, are generally low. Uptake in the near-surface waters by phytoplankton further reduces the concentrations of inorganic nutrients. Upwelling of nutrients regenerated at depth provides a source for enhanced plankton production, as does wastewater discharge. Water quality data for the South Bay area were collected for the TOES study (Engineering Science 1988). The seasonal variations in dissolved oxygen concentrations and pH levels were consistent with the rest of the California bight.

Sediment samples were also collected during the TOES. Organic carbon, biological and chemical oxygen demand, sulfides, total nitrogen, arsenic, lead, nickel, zinc, copper, chromium, cyanide, and DDT were highest in the northwest areas. Sediments were highest in mercury, cadmium, silver, and phenol in the central areas, and adjacent to the Tijuana estuary, higher sediment concentrations were found for nickel, zinc, copper, chromium, and DDT.

Bacterial Contamination. Wastewater flow threatens the environment of the Tijuana River estuary with severe negative impacts and contaminates beaches in southern San Diego County. Because of malfunctions in Tijuana's pumping and conveyance systems, EPA previously estimated that 10 to 22 mgd (438 to 964 LPs) flows from Tijuana to San Diego by way of the Tijuana River and estuary (Kinnetic 1990). Mexico has now significantly reduced these flows.

The San Diego County Department of Health Services has data regarding violations of the bacteriological standards on South County beaches. From 1980 to 1991, approximately two miles of beach (from the international border to the south end of Seacoast Drive) have been under almost continuous quarantine due to violations of total coliform standards. Since 1983, these South County beaches has been sampled by four agencies, the RWQCB, the County of San Diego, the city of San Diego, and the USIBWC. These efforts result in samples being taken every two to three days, with only occasional missed sampling dates.

New Information. In accordance with an agreement between the USIBWC and the EPA, the City of San Diego, under contract, is conducting an ongoing baseline monitoring program to characterize the future discharge site for the South Bay Ocean Outfall. These surveys characterize the ecological health of the coastal area which will be impacted by the wastewater discharge from the South Bay Ocean Outfall. The ongoing monitoring program began in 1995, and includes survey points from the tip of Point Loma southward to Punta Bandera, Baja California, Mexico. It also spans from the shoreline seaward to a depth of about 200 ft. This information is summarized from three years of data from the Ocean Monitoring Program conducted in 1994/95, 1995/96 and 1996/97.

The grid of sampling stations includes forty randomly selected sites at which physical water column data is collected and sediments are sampled and twenty-nine randomly selected sites are used for otter trawls and fish tissue analysis (see Section 3. 5, Marine Biology). Sampling includes monthly water column profiles of physical parameters, along with discrete depth samples for bacteriological, oil and grease, and total suspended solids analyses. Semi-annual samples of the sediments were taken for benthic infaunal assessment and for analysis of sediment grain size and sediment chemistries. Monthly bioassays were performed on seawater samples to determine if ambient toxicity was present before initiation of the discharge.

New Water Quality Monitoring. New water quality monitoring to date indicates occasional high levels of coliform bacteria, at the southernmost extreme area of the sampling locations. This may be caused by the surf zone wastewater discharge near the San Antonio de los Buenos Wastewater Treatment Facility. Runoff from the Tijuana River during the rainy season also caused occasional increases in coliform densities at the shoreline stations just north of the U.S./Mexico border.

Water quality with respect to coliform bacteria was generally good at the offshore stations, with only infrequent coliform exceedances due to the shoreline discharge near San Antonio de los Buenos Wastewater Treatment Facility. Temperature, salinity, transmissivity, and dissolved oxygen were most influenced by the season and by increasing depth and distance from the shore. Other factors affecting the physical water parameters include upwelling and plankton blooms in spring and summer, and storm activities.

New Toxicity Testing. New toxicity testing on seawater samples using the kelp germ tube growth bioassay, indicated ambient toxicity. In addition, ambient toxicity was observed within the study area over the multiple years of observation. The results were inconclusive with respect to determination of an appropriate station for collection of reference water for future SBIWTP effluent bioassays. Following initiation of discharge, a proper reference station can be identified with more confidence.

### 3.3 Terrestrial Biology

Existing conditions remain consistent with the description in the 1996 SEIS are briefly summarized here.

The Tijuana River on the U.S. side of the border meanders in a northwesterly direction to the Pacific Ocean. The current riparian corridor extends from Dairy Mart Road to the eastern boundary of the Tijuana River estuary. Within the Tijuana River estuary, there is a transition from riparian habitat to salt marsh habitat which is influenced by the tidal prism.

The Tijuana River valley supports the following riparian habitat types: mule fat scrub, southern willow scrub and woodland, freshwater marsh, and disturbed floodplain. Black willow *(Salix gooddingii),* red willow *(S. laevigata),* and an occasional cottonwood *(Populus sp.)* make up the tree layer while arroyo willow *(S. lasiolepis),* sandbar willow *(S. hindsiana),* and mule fat *(Baccharis salicifolia)* are the primary large shrub species present.

To the west of Dairy Mart Road are stands of mule fat scrub, southern willow scrub, and southern willow woodland growing along the low-flow channel and out into the floodplain of the river. The riparian habitat of the floodplain is relatively undisturbed except where agriculture, migrants, or river scour has impacted the vegetation. Areas of the low-flow channel where backwater collects or ponds exist can support small stands of freshwater marsh. In addition, several large ponds sustained by groundwater that support freshwater marsh vegetation occur just south of Interstate 5, east and west of Dairy Mart Road.

The riparian habitat of the Tijuana River valley supports a wide variety of wildlife species. Common wildlife species observed include mule deer *(Odocoileus hemionus),* southern pocket gopher *(Thomomys umbrinus),* California ground squirrel *(Spermophilus beecheyi),* striped skunk *(Mephitis mephitis),* opossum *(Didelphis virginiana),* green-winged teal *(Anas crecca carolinensis), mallard (Anas platyrhynchos platyrhynchos),* scrub jay *(Aphelocoma californica),* mourning dove *(Zenaida macroura marginella),* loggerhead shrike *(Lanius ludovicianus),* red-tailed hawk, sharp-shinned hawk *(Accipiter striatus velox),* Cooper's hawk *(Accipiter cooperii),* black-shouldered kite *(Elanus caeruleus),* northern harrier *(Circus cyaneus hudsonius),* house finch *(Carpodacus mexicanus frontalis),* lesser goldfinch *(Carduelis psaltria hesperophilus),* song sparrow, common yellowthroat *(Geothlypis trichas),* Bewick's *wren (Thyromanes bewickii),* Nuttall's woodpecker *(Dendrocopos nuttallii),* northern flicker (Colaptes *auratus),* yellow-rumped warbler *(Dendroica coronata),* white-crowned sparrow, yellow-breasted chat *(Icteria virens auricollis),* yellow warbler *(Dendroica petechia),* least Bell's vireo *(Vireo bellii pusillus),* orange-throated whiptail *(Cnemidophorus hyperythrus beldingi),* and bullfrog *(Rana catesbeiana).* Federal endangered or threatened wildlife species that occur or could occur in the area of the proposed action are Pacific little pocket mouse, California brown pelican, light-footed clapper rail, California least tern, American peregrine falcon *(Falco peregrinus anatum),* western snowy plover, coastal California gnatcatcher *(Polioptila californica californica),* southwestern willow flycatcher *(Empidonax traillii extimus),* and least Bell's vireo. One federal endangered plant species occurs in the area of the proposed action, salt marsh bird's beak. Details of the population status of each of these species in the Tijuana River valley are contained in the Biological Assessment for the Final EIS (EPA 1994).

### 3.4 Estuarine Biology

The information provided in this section is derived primarily from the Biological Impacts of Interim Discharge of Primary Treated Effluent from the International Wastewater Treatment Plant to the Tijuana Estuary, prepared by Tierra Environmental Services (1 996). This report is included as Appendix B of the 1996 SEIS.

The Tijuana estuary is located in the southwestern corner of the continental U.S. and has been designated the Tijuana River National Estuarine Research Reserve by the NOAA. The reserve includes approximately 2,500 acres (1,012 ha), of which 149 acres (60 ha) are tidal channels (Nordby and Zedler 1991). The Tijuana River bisects the estuary into a northern arm and a southern arm and rarely provides substantial freshwater except during exceptionally wet winters or in years with sewage-augmented flows.

The Tijuana estuary supports a diverse assemblage of species and habitats in response to high variability in

topography, tidal influence, and stream flow. Seven major habitat types have been identified, including estuarine channels and tidal creeks, salt marsh, brackish marsh, intertidal flats, salt pan, transition from upland to wetland, and dunes and beach (Zedler and Nordby 1986). The habitats that are most likely to be impacted by raw or treated sewage are the channels and tidal creeks, intertidal flats, intertidal marsh and, to a lesser degree, dunes and beaches. For the purpose of this discussion, channels, tidal creeks, and intertidal flats are considered a single continuous habitat dominated by water at extreme high tides and intertidal flats with subtidal refuges during extreme low tide.

Several federally listed endangered and threatened species are known to occur, or may potentially occur within the Tijuana estuary. These species include the federally endangered salt marsh birds beak *(Cordylanthus maritimus ssp. maritimus),* Light-footed Clapper Rail *(Rallus longirostris levipes)* California Least Tern *(Sterna antillarum browni)* , California Brown Pelican (*Pelecanus occidentalis californicus*), federally threatened Western Snowy Plover *(Charadrius alexandrinus nivosus),* and state endangered Belding's Savannah Sparrow *(Passerculus sandwichensis beldingi).*

### 3.5 Marine Biology

Existing conditions remain consistent with the description in the 1996 SEIS; a brief summary is provided here, as well as new baseline monitoring data.

Intertidal Communities. Biological studies conducted on the beaches from Coronado to the U.S.-Mexico border indicate that the most conspicuous organisms are sand crabs *(Emerita analoga),* beach hoppers *(Orchestoidea* spp.), olive snails *(Olivella biplicata),* and bean clams *(Donax gouldii)* (Clark 1969; Dexter 1977; Parr et al. 1978; Straughn 1982; MBC 1990). Several smaller amphipod and isopod crustaceans and polychaete annelids also inhabit the shoreline sands. In the spring, grunions spawn and deposit their eggs on these beaches.

The California State Mussel Watch and National Status and Trends programs have found increased organic contaminants in California mussels collected from the Imperial Beach area (State of California 1988, 1994a; NOAA 1989; O'Connor and Beliaeff 1995). High concentrations of DDT and dieldrin suggest agricultural sources of contamination, as opposed to industrial and marina sources within San Diego Bay.

Benthic Communities. Benthic infauna refers to the assemblage of usually small, invertebrate organisms which live in the soft sediments of the seafloor. Most benthic organisms live within the upper four inches (10 cm) of sediment and consume dead organic matter (detritus) or are predators. This community, which is relatively immobile, is important for its use as a food resource for epibenthic macroinvertebrates and demersal fish and is important in the conversion of organic deposits into biomass available to higher trophic levels.

Baseline information on the benthic community of the South Bay, generally from the mouth of San Diego Bay to the international border and offshore of far northern Baja California, was collected for the TOES in 1986 and 1987 (Engineering Science 1988). Abundance and community composition were found to vary with depth. Along the 66-ft (20 m) depth contour, the common species were the polychaete *Magelona sacculata* and the clam *Tellina modesta,* and at 131-ft (40 m) depths, the polychaete *Euchone arenae* was dominant. In the northern portion of the area, the brittle star *Amphiodia urtica* and the polychaete *Spiophanes missionensis* were the dominants at 198 ft (50 m), while to the south, the tube snail *Caecum crebricinctum* and the white sea urchin *Lytechinus pictus* predominated.

Kelp Beds. Small kelp beds occur within the South Bay area. As the giant kelp *(Macrocystis pyrifera),* feather boa kelp *(Egregia laevigata),* palm kelp *(Pterygophora califonica),* and other macroalgae which form kelp forests require an attachment substrate, the occurrence of kelp beds is usually restricted to areas of subtidal rocks, boulders, and cobble within the photic zone (generally 20 to 60 ft [6.1 to 18.3 meters]).

Two small patches of kelp bed, referred to as the Imperial Beach bed, occur off the Imperial Beach Pier and near the

Tijuana Slough mouth, about 2.5 and 1.0 miles (4.0 and 1.6 km) north, respectively, of the future outfall pipeline corridor. The Imperial Beach bed is attached to boulders and cobbles, as opposed to consolidated reef. Recent surveys have shown that the bed is maintaining a small canopy, with the most recently available figures indicating a canopy area of about 24.7 acres (0.1 km2) (MBC 1995).

Fish Populations. Fifty-one species of fish have been observed at depths of 30 to 120 ft (9.1 to 36.6 m) in surveys of the Imperial Beach kelp bed, offshore over soft bottoms (Southern California Coastal Water Research Project [SCCWRP] n.d.; City of San Diego 1995), and in a description of San Diego recreational fishing areas (Squire and Smith 1977). Twenty-eight of the species are found primarily on soft bottoms, 16 on hard bottoms and in kelp beds, and 7 are pelagic.

Marine Mammals. The Southern California Bight contains the largest and most diverse populations of marine mammals in temperate waters of the world, with as many as 31 species (Norris et al. 1975). Most are seasonal migrants and are widely distributed throughout the bight. The most abundant species are

California gray whale *(Eschrichtius robustus*), Risso's dolphin *(Grampus griseus),* common dolphin *(Dephinus* delphis), and California sea lion *(Xalopus califomianus)* (Schulberg et al. 1989).

Twenty-four species of cetaceans (whales, dolphins, and porpoises) are found in the Southern California Bight, six of which are listed as endangered (the gray whale was recently removed from the endangered list). Only the gray whale and the bottlenose dolphin *(Tursiops truncatus)* occur frequently near shore in the vicinity of South Bay. All species are either transient or migratory in the area. Six species of pinnipeds (seals and sea lions) may also be found in the Southern California Bight (Bonnel 1985).

Marine Birds. The seabird fauna of the Southern California Bight is comprised of approximately 80 species (excluding shorebirds), only 30 of which are relatively numerous (Bender et al. 1974; Briggs et al. 1981). Nearly half of the species are winter visitors, present principally from October through April. These include loons, grebes, sea ducks, gulls, terns, jaegers, and alcids (murres, auklets, and puffins). A few species are transients, and a small number of strays are recorded each year.

Shorebirds also use the shores and waters of the South Bay area. Most available information on shorebirds is based on surveys in coastal lagoons, marshes, and mud flats, but they may also feed on adjacent beaches (Table 3.5-4). Two protected habitats, south San Diego Bay and the Tijuana estuary, are immediately adjacent to the South Bay.

The majority of coastal shorebirds are migratory and are typically absent in summer. However, a few-such as western snowy plover (federally listed threatened), long-billed curlew (California species of concern), black oystercatcher *(Homotopies bachmani),* whimbrel, and marbled godwit-are present year-round and may breed locally. The most abundant species include western sandpiper *(Calidris mauri),* least sandpiper *(Calidris minutllia),* dowitchers, willet, marbled godwit, American avocet *(Recurvirostra americana),* sanderling, and semipalmated plover *(Charadrius semipalmatus)* (Warnock et al. 1989). Seabirds, such as gulls, terns, and pelicans, may use the same habitats as shorebirds for resting and nesting.

New Information. In accordance with the NPDES permit, the City of San Diego, under contract for the USIBWC and EPA, is conducting an ongoing baseline monitoring program to characterize the future discharge site for the South Bay Ocean Outfall. A brief summary of the results of this program is provided here.

The grid of sampling stations includes twenty-nine randomly selected sites used for otter trawls and fish tissue analysis. Semi-annual samples of the sediments were taken for benthic infaunal assessment and for analysis of sediment grain size and sediment chemistries. Otter trawls were performed quarterly to identify patterns in the demersal fish and macrobenthic communities. Additionally target fish were collected from these trawls and from

semiannual rig fishing surveys for priority pollutant tissue burden analyses.

New Benthic Monitoring Data. Benthic communities in the study area were characterized by coarse sediment assemblages similar to other shallow water habitats in the Southern California Bight. There is little evidence of any anthropogenic influence in the region in terms of the sediment chemistry parameters or the distribution of the various benthic assemblages. Although the patterns of species distribution and abundance varied with depth and sediment type, there was no other clear spatial or temporal patterns.

New Epibenthic Trawls Data. The fish assemblages in this region were notable for the low numbers of both species and abundance and were generally defined by substrate and refuge preferences of the various fish species. The assemblages were dominated by the speckled sanddab, the white croaker, the queenfish and the longfin sanddab. The macro-invertebrate community was also characterized by relatively low numbers for both number of species and abundance, although variability was quite high.

New Tissue Burden Analyses Data. The levels of chemical constituents detected in fish tissues collected in the sampling area fell within the range of levels detected throughout the Southern California Bight. Various trace metals were the most commonly detected chemical constituents in the fish tissues examined. Tissue concentrations of chlorinated pesticides, including DDT derivatives and PBCs, were generally very low.

### 3.6 Public Health

Existing conditions remain consistent with the description in the 1996 SEIS; a brief summary is provided here.

Background. As discussed previously in the 1994 FEIS, the Tijuana River is highly contaminated by continuing spills from the Tijuana sewerage system and by drainage of sewage from large populated areas within the city of Tijuana that are not served by any sewer system. Sewage flows from Tijuana have been reduced since 1991 and the conditions that currently exist in the valley have improved. However, continuing sewage flows pose environmental and health concerns, including vector-borne disease. Standards for water quality for human health and safety are established in the Water Quality Control Plan for the San Diego Region (Basin Plan). The Tijuana River is designated for non-body contact recreation.

Beach Quarantines. Water quality criteria for marine waters are defined by the State Water Resources Control Board (SWRCB) in the Water Quality Control Plan: Ocean Waters of California (State of California 1990a), known as the Ocean Plan. Discharge of untreated or treated sewage into the marine environment may cause a variety of public health risks including bacteria, viruses, and toxic or carcinogenic constituents. Of greatest concern are pathogenic organisms (bacteria and viruses), as their effects may lead to direct harm to humans. Concerns for the effects of toxics, metals, and carcinogens that may be discharged with sewage or treated effluent are usually directed to marine biota and would be harmful to humans through uptake in food sources.

The San Diego County Department of Health Services has data regarding violations of the bacteriological standards on South County beaches. From 1980 to 1991, approximately two miles (1.2 km) of beach (from the international border to the south end of Seacoast Drive) have been under almost continuous quarantine due to violations of total coliform standards. The intent of the quarantine is to reduce exposure and thus risk to public health. The Department of Health Services has also occasionally quarantined beaches as far north as Coronado, prior to 1985 (Melbourn, pers. com. 1991). Once the river diversion structure was installed by Mexico in 1991, the quarantines were placed on an intermittent basis north of the mouth of the river, extending as far as the Silver Strand.

In addition to the public health threat caused by sewage-contaminated river flows, limited modeling studies performed by Engineering Science in 1991 resulted in data which indicate that the beach discharge of effluent from the San Antonio de los Buenos Wastewater Treatment Facility may result in exceedances of water quality standards in U.S. waters (Engineering Science 1991). Effluent discharged onto the beach travels northward with the near shore

ocean current. The modeling, while extremely limited, indicates that ocean standards could be violated as far north as the beaches of Imperial Beach and the kelp bed offshore from the discharge in Mexico.

Other sources of bacterial contamination to coastal waters exist, however (storm flows, urban runoff, sewer breaks in the U.S., etc.), and the frequency and relative contribution of the various sources have not been determined or the individual significance evaluated.

Vectors. The Tijuana River valley is host to at least 14 of 24 mosquito species known to occur in San Diego County, including those capable of transmitting diseases. The lack of adequate water drainage and waterway maintenance and the constant flow of wastewater into the Tijuana River valley has created an environment where mosquito breeding is rampant.

San Diego County Mosquito Abatement Program. No cases of viral encephalitis or malaria have been documented within the Tijuana River valley, though all of the parameters necessary for transmission of these vector-borne diseases are present. To prevent potential outbreaks of these diseases through vector-borne disease transmission, the County Environmental Health Services has engaged in various mosquito abatement programs. These programs have included stocking ponds with mosquito fish, placing larvaecidal oil on bodies of standing water, and spraying with chemicals agents. None of these measures have resulted in substantial reductions in the mosquito population.

**4.0 Environmental Consequences**

The effects of interim discharge are analyzed in the 1996 SEIS; conclusions from that document are briefly discussed here for each of the resources considered. For a complete discussion of the environmental consequences, see Chapter 4 of the 1996 SEIS. The primary purpose of the additional discussion provided here is to disclose and analyze the effects of dioxin and acute toxicity to the environment. This chapter only addresses new or different potentially significant environmental impacts resulting from the new information on dioxin and acute toxicity.

## 4.1 Hydrology and Water Quality

This section describes the hydrological and water quality impacts anticipated to result from implementation of each of the alternatives. Evaluation of the water quality impacts is based upon compliance with regulatory standards including the Federal Clean Water Act, Porter-Cologne Water Quality Act, and the Water Quality Control Plan for the San Diego Basin.

### 4.1.1 Alternative I - No Action

The No Action Alternative requires a delay in operating the SBIWTP until the secondary treatment component is completed. Under this alternative, therefore, raw sewage flows in excess of the capacity of Tijuana's Pump Station One and conveyance system would flow into the Tijuana River. Use of the city of San Diego's emergency connection would be discontinued. Raw sewage discharged to the surf zone adjacent to the San Antonio de los Buenos Wastewater Treatment Plant in Mexico is expected to continue.

**1996 SEIS Summary**

The flow of untreated raw sewage in the river will degrade the water quality of the river and the Tijuana estuary. Clearly, the untreated sewage does not comply with water quality standards and objectives for surface, ground, or ocean waters. Under this alternative, untreated dry-weather sewage flows and associated pollutants would enter the Tijuana River in Mexico and flow into the U.S., eventually reaching the Pacific Ocean. Significant, unavoidable adverse effects to the surface water, groundwater, estuary, and near shore ocean waters would result. In addition, the discharge of effluent at the shoreline in Mexico would have potential adverse consequences to near shore ocean waters in the U.S. and Mexico; coliform standards could be exceeded. No mitigation was identified in the 1996 SEIS for the No Action Alternative.

**Dioxin Analysis**

The untreated sewage in the Tijuana River does not comply with standards and objectives for surface, ground, or ocean waters. The presence of dioxin in the raw sewage may further add to the significant impacts to the Tijuana River and to the shoreline in Mexico as described in the 1996 SEIS. Impacts from dioxin in the Mexican discharge at the surf adjacent to San Antonio de los Buenos Wastewater Treatment Facility is not anticipated to significantly affect U.S. waters due to the low levels of dioxin present in the discharge and the high dilution provided by the ocean currents.

**Acute Toxicity Analysis**

Influent samples from Tijuana were collected and tested for acute toxicity; the influent was found to exceed California Ocean Plan standards for acute toxicity. An exceedance of the acute toxicity parameter adds to the impacts to the Tijuana River and to the near shore ocean waters in Mexico as described in the 1996 SEIS. Furthermore, without verification regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter from the surf zone discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility may possibly affect U.S. waters.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, Mexico. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0. Dioxin and acute toxicity would not affect river hydrology and therefore, no mitigation is required.

### 4.1.2 Alternative 2 Operate the SBIWTP

Under this alternative, raw sewage flows in excess of Pump Station One in Mexico (up to 25 mgd [1,095 LPS]) would flow to the SBIWTP and would be treated to advanced primary standards. Advanced primary treated effluent would then be discharged to the Tijuana river. Raw sewage discharge to the surf zone adjacent to the San Antonio de los Buenos Wastewater Treatment Facility in Mexico is also expected to continue.

**1996 SEIS Summary**

Flow of advanced primary effluent and associated pollutants to the river will significantly degrade the water quality of the river, groundwater, estuary, and near shore waters, although the pollutant concentrations in the advanced primary treated effluent could be less than present in raw sewage. Additionally, the direct discharge of advanced primary treated effluent to the river is not authorized by the federal Clean Water Act and the Water Quality Control Plan for the San Diego Basin. Hence, the direct discharge of advanced primary treated effluent to the river is a significant impact. In addition, the discharge of effluent at the shoreline in Mexico near the San Antonio de los Buenos Wastewater Treatment Plant would have potential adverse consequences to near shore ocean waters in the U.S. and Mexico, since coliform standards could be exceeded. No mitigation was identified in the 1996 SEIS for this alternative.

**Dioxin Analysis**

Modeling of advanced primary effluent concentrations for dioxin was based on sewage samples collected from September 1996 to April 1998. Of the 14 months considered from this data set, the advanced primary treated effluent was predicted to exceed NPDES permit limits for five months. Based on this modeling effort, dioxin is predicted to exceed NPDES standards 36% of the time. From April 1997 to August 1998, the plant was operated for approximately 10 months with the dioxin effluent limit actually exceeded three times during this period. Predicted and actual dioxin exceedances of the NPDES and Ocean Plan limits could result in significant adverse impacts to water quality in the Tijuana River and to the shoreline in Mexico. Impacts from dioxin from the shoreline discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Plant are not anticipated to significantly affect U.S. waters due to the relatively low levels of dioxin present in the discharge and the relatively high dilution provided by the ocean currents.

**Acute Toxicity Analysis**

Additional testing of SBIWTP effluent indicates the effluent exceeds acute toxicity standards. Acute toxicity is used to estimate the aggregate toxic effect (i.e., lethality) of an effluent using standardized, surrogate freshwater vertebrates or invertebrates. Acute toxicity exceedances of the NPDES and Ocean Plan limits could result in adverse impacts to water quality and are, therefore, considered significant. Acute toxicity testing of influent from Tijuana has also been completed and the influent was also found to exhibit high levels of acute toxicity. An exceedance of the acute toxicity parameter adds to the impacts to the Tijuana River and the U.S. near shore ocean as described in the 1996 SEIS. Furthermore, without additional analysis regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter from the surfzone discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Plant may have significant affects to U.S. waters.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

### 4.1.3 Alternative 5

Operate the SBIWTP with Discharge to SBOO. Under this alternative, an average of 25 mgd (1,095 LPS) of raw sewage from Mexico would be treated to the advanced primary level at the SBIWTP and released to the SBOO for discharge to the ocean. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Plant is expected to be substantially reduced.

**1996 SEIS Summary**

With the release of advanced primary effluent from the SBOO, no significant, direct impacts to the Tijuana River valley, estuary, or local beaches would occur. Therefore, no hydrological mitigation measures would be required for the SBOO discharge. Parsons Engineering Science modeled the effects of the SBOO discharge of advanced primary effluent on ocean water quality. The results of the modeling found that the only parameter of the treated effluent that would exceed Ocean Plan standards given the level of initial dilution (100:1) at the point of discharge would be polynuclear aromatic hydrocarbons (PAHs). Only one location along the shoreline at the edge of the Imperial Beach kelp bed was identified as having the potential for exceedances of the Ocean Plan coliform standards. As the SBOO discharge may not meet Ocean Plan standards for all criteria pollutants, significant adverse impacts to ocean water quality could occur. In addition, the direct discharge of advanced primary treated effluent to the ocean is inconsistent with the Clean Water Act and Ocean Plan. Finally, the discharge of effluent at the shoreline in Mexico near the San Antonio de los Buenos Treatment Facility would have potential adverse consequences to near shore ocean waters in the U.S. and Mexico, since coliform standards could be exceeded.

**Dioxin Analysis**

As discussed in Section 4.1.2, predicted and actual dioxin exceedances of the NPDES permit and Ocean Plan limits could result in adverse impacts to ocean water quality and are therefore considered significant. Impacts from dioxin from the surfzone discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility, however, are not anticipated to significantly affect U.S. waters due to the low levels of dioxin present in the discharge and the high dilution provided by the ocean currents.

**Acute Toxicity Analysis**

Consistent with the discussion in Section 4.1.2. acute toxicity exceedances of the NPDES and Ocean Plan limits could result in adverse impacts to water quality and are therefore considered significant. Furthermore, without verification regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter from the discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility may have significant affects to U.S. waters.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

### 4.2 Oceanography

This section describes the oceanographic impacts anticipated to result from each of the alternatives. Evaluation of the oceanographic impacts is based, in part, upon compliance with State Ocean Plan Standards, Clean Water Act, and the Porter-Cologne Water Quality Act.

#### 4.2.1 Alternative 1 - No Action

The No Action Alternative requires a delay in operating the SBIWTP until the secondary treatment component is completed. Under this alternative, therefore, raw sewage flows in excess of the capacity of the Mexican collection and conveyance system would flow into the Tijuana River. Use of the city of San Diego's emergency connection would be discontinued. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

Significant oceanographic impacts would occur near shore in the vicinity of the Tijuana River mouth due to the direct discharge of untreated wastewater to the Tijuana River. Pollutant concentrations in excess of Ocean Plan standards may reach the ocean, and high bacteria coliform counts would continue to indicate a significant impact to local beaches in the United States. Further, the discharge of both treated and untreated wastewater at the shoreline in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is expected to result in bacteria coliform counts that could exceed the Ocean Plan standards in U.S. waters up to the Tijuana River. This would continue to significantly impact local beaches in the United States. Of the potential pollutants detected during influent testing and modeled in 1996 for a Mexico shoreline discharge, only Polynuclear Aromatic Hydrocarbons (PAHs) were predicted to reach U.S. waters in concentrations exceeding Ocean Plan standards. This would be considered significant if it were to occur. No mitigation was identified in the 1996 SEIS for the No Action Alternative. The discharges in Mexico are the responsibility of Mexico in coordination with the USIBWC under the provisions of Minute No. 270. The effects of the discharges of sewage on oceanographic resources are considered significant and unmitigated.

**Dioxin Analysis**

The addition of dioxin as another sewage constituent may further add to the significant impacts of raw sewage discharged to the near shore environment via the Tijuana River. Impacts from dioxin from the discharge in Mexico near the San Antonio Wastewater Treatment Facility, however, are not anticipated to significantly affect U.S. waters due to the low levels of dioxin present in the discharge and the high dilution provided by the ocean currents.

**Acute Toxicity Analysis**

Acute toxicity testing of Mexican influent has also been completed and the influent was also found to exceed acute toxicity parameters. Therefore, a raw sewage discharge to the near shore marine environment via the Tijuana River is anticipated to have significant impacts. Furthermore, without verification regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter from the surfzone discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility may have significant affects to U.S. waters.

**Mitigation**

Mitigation is consistent with mitigation described in the 1996 SEIS. The primary mitigation would be a pretreatment program in Mexico. See Section 5.0 for a discussion of the pretreatment plan.

### 4.2.2 Alternative 2 - Operate the SBIWTP

Under this alternative, raw sewage flows in excess of Pump Station One and conveyance system in Mexico (up to 25 mgd) would flow to the SBIWTP and would be treated to advanced primary standards. Use of the city of San Diego's emergency connection would be discontinued. Advanced primary treated effluent would then be discharged to the Tijuana River. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

The oceanographic impacts in the vicinity of the mouth of the Tijuana River are similar to those discussed above under the No Action Alternative. However, rather than discharging untreated sewage to the river, the excess flow discharged to the river would be advanced primary effluent. Therefore, oceanographic impacts associated with implementation of this alternative are expected to be less than those which would occur under the No Action Alternative. Nevertheless, the direct discharge of advanced primary effluent to the river and the resulting flow to the ocean would not be authorized by the Clean Water Act and the Ocean Plan. Significant oceanographic impacts would occur near shore in the vicinity of the Tijuana River mouth and north to Imperial Beach due to the direct discharge of advanced primary effluent to the river. Mitigation was not identified in the 1996 SEIS for this alternative. The Mexican surf discharge flow volumes and impacts would be similar to those discussed above under Alternative 1 - No Action. Mitigation for impacts due to the surf discharges in Mexico near the San Antonio de los Buenos Wastewater Treatment Plant is not available to EPA or USIBWC for this alternative. The effects of the discharge of treated effluent and sewage on oceanographic resources are considered significant and unmitigated. The discharges in Mexico are the responsibility of Mexico in coordination with the USIBWC under the provisions of Minute No. 270. Mexico will determine if additional measures are to be taken.

**Dioxin Analysis**

As discussed in Section 4.1.2, predicted and actual dioxin exceedances of the NPDES and Ocean Plan limits could result in adverse impacts to oceanographic resources and are therefore considered significant. Impacts from dioxin from the shoreline discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility, however, are not anticipated to significantly affect U.S. waters due to the low levels of dioxin present in the discharge and the high dilution provided by the ocean currents.

**Acute Toxicity Analysis**

Consistent with the discussion in Section 4.1.2, acute toxicity exceedances of the NPDES and Ocean Plan limits could result in adverse impacts to water quality and are therefore considered significant. Furthermore, without additional analysis regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter from the discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility may have significant affects to U.S. waters.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

### 4.2.3 Alternative 5 - Operate SBIWTP with Discharge to SBOO

Under this alternative, an average of 25 mgd (1,095 LPS) of raw sewage from Mexico would be treated to the advanced primary level at the SBIWTP and released to the SBOO for discharge to the ocean. Raw sewage discharge to the surf zone in Mexico is expected to be substantially reduced.

**1996 SEIS Summary**

Advanced primary effluent discharges through the South Bay Ocean Outfall were modeled by Parsons Engineering Science during preparation of the 1996 SEIS. Results of the modeling indicate that concentrations of PAHs in the SBOO zone of initial dilution may potentially exceed Ocean Plan standards. Also, one location along the shoreline at the edge of the Imperial Beach kelp bed was identified as having the potential for exceedances of the Ocean Plan coliform standards. The discharge of advanced primary effluent to the ocean through the SBOO is not authorized by the federal Clean Water Act. This is a significant, unavoidable impact. Although the volume of raw sewage discharged to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility would be reduced (as the SBIWTP would treat a larger volume of sewage), the Mexican surf discharge impacts would be similar to those discussed above under Alternative 1 - No Action. As indicated previously (USIBWC 1994, 1996), Mexico has agreed to implement a source reduction program, which is under development. However, until a program is implemented, these impacts are considered significant and unmitigated.

**Dioxin Analysis**

The discussion presented here is summarized from the dioxin analysis found in Appendix A, which evaluates the fate of dioxin in advanced primary treated effluent. In September 1996, a new laboratory was contracted to conduct dioxin analyses for the effluent at the SBIWTP using a higher resolution instrument that could detect dioxin at lower concentrations. Use of the higher resolution instrument resulted in detections of dioxin. For that reason an additional evaluation was performed using laboratory analyses of emergency connection wastewater samples that were collected from September 1996 through April 1998.

It should be noted that there are inherent difficulties with detecting and accurately measuring dioxin concentrations in the range required to determine compliance with the regulatory standards. Dioxin is measured in picograms per liter (pg/L), which is parts per quadrillion (ppq) and is equivalent to 0.000000000001 grams per liter (g/L).

Development of Wastewater Influent Concentration. A representative influent concentration of dioxin was developed and used to estimate dioxin concentrations in treatment plant sludge and effluent, marine water and sediment quality, and the effect on marine biological resources. The data set of emergency connection monitoring reports from September 1996 through April 1998 was screened prior to acceptance and use in the estimation. 14 of the 19 analyses were acceptable based on compliance with EPA quality control and quality assurance (QA/QC) methods. The average and maximum concentrations from this data set were used to develop representative influent conditions for the SBIWTP. Monthly maximum, minimum, and average values were used to model the fate of dioxin and the impacts from an advanced primary discharge from the SBOO.

Removal Efficiencies. The fate of dioxin through the SBIWTP advanced primary treatment process was modeled to identify where the dioxin would go (i.e., into the sludge or out with the effluent) and whether the concentration detected in the sludge and effluent could be hazardous. It is generally believed that when dioxin is in a solution of liquids and solids, the very large majority of dioxin is strongly adsorbed to the solids (EPA, 1989; Jonsson, et al., 1993; and Chernysh, et al., 1992). For wastewater, this means that dioxin will be primarily found in the sludge or the solids that are discharged in the effluent, which are either transported away or settle as nearby sediment. For the advanced primary process, the actual performance of the SBIWTP was used to generate a removal efficiency. The plant operated for seven months between April 1997 and March 1998. The average removal efficiency of dioxin during this period was 80% based on influent and effluent concentrations reported to the Regional Water Quality

Control Board (RWQCB).

Effluent Concentrations. The advanced primary treated effluent concentration for dioxin was calculated by using the estimated average sewage influent concentration and the identified removal efficiency for the treatment process. This calculated concentration was than compared to the discharge limit for dioxin which is defined by the RWQCB NPDES permit as a 30-day average effluent concentration. As seen in Table 6 of the Dioxin Report (Appendix A), the advanced primary treatment process is not projected to exceed the NPDES permit limit under average influent concentrations. Because the monitoring requirements only require one sample to be collected per month, the monthly averages shown in Table 6 actually consist of a single measurement. For this reason, the NPDES limit was also compared to the maximum effluent concentration and to the effluent concentrations that theoretically would have occurred if the advanced primary treatment process were operational during the time the samples were collected. As indicated in Table 6, the advanced primary treatment process shows an exceedance for five of the 14 months sampled. Based on this modeling effort, dioxin is predicted to exceed NPDES standards 30% of the time.

The advanced primary effluent from the SBIWTP has been analyzed since the plant became operational in April 1997. From the period of April 1997 to August 1998 the plant was operated for ten months; the dioxin effluent limit was exceeded three times during this period.

Marine Water Concentrations. Effluent concentrations were compared with NPDES permit limitations while marine water concentrations (after a dilution of l00:l) were compared with 0cean Plan limits. In comparison to the NPDES permit limits, the Ocean Plan limits are reduced by a factor of .01, since the Ocean Plan allows for a 100:1 initial dilution of effluent in the ocean.

An analysis for marine water concentrations was completed, similar to the analysis for effluent concentrations. The advanced primary treatment process is in compliance with the Ocean Plan for dioxin when the average value of the samples is considered. However, like the NPDES permit requirements, the Ocean Plan requires compliance with a monthly average. As only one sample per month was taken, the monthly average consists of this one measurement. On this basis, the advanced primary treatment alternative would not meet the Ocean Plan requirements for five of the 14 months reviewed.

From the period of April 1997 to August 1998 the plant was operated for approximately 10 months with the dioxin effluent limit actually exceeded three times during this period. It is assumed therefore, that Ocean Plan limits would have also been exceeded at those times. Because of the exceedance of regulatory standards, impacts from dioxin are considered significant. Impacts from dioxin from the discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility, however, are not anticipated to significantly affect U.S. waters due to the low levels of dioxin present in the discharge and the high dilution provided by the ocean currents.

**Acute Toxicity Analysis**

Consistent with the discussion in Section 4.1.2, acute toxicity exceedances of the NPDES and Ocean Plan limits could result in adverse impacts to water quality and are therefore considered significant. Furthermore, without verification regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter from the discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Plant may have significant affects to U.S. waters.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

### 4.3 Terrestrial Biology

Potential impacts to terrestrial biological resources within the riparian corridor of the Tijuana River were considered in the 1996 SEIS. The impacts from dioxin and acute toxicity on the terrestrial resources along the riparian corridor are considered below.

#### 4.3.1 Alternative 1 - No Action

The No Action Alternative requires a delay in operating the SBIWTP until the secondary treatment component is completed. Under this alternative, therefore, raw sewage flows in excess of the capacity of the Mexican collection and conveyance system would flow into the Tijuana River. Use of the city of San Diego's emergency connection would be discontinued. Raw sewage discharge to the surf zone in Mexico near San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

Raw sewage flows would carry increased nutrient levels, the highest organic matter contents, and the highest concentrations of toxic elements through the system. Most of these constituents flow through the riparian area to the estuary and ocean at the mouth of the river. Potential concentration of nutrients, organic matter, and toxic elements would only be evident in backwater areas where water ponds for long periods of time. These ponds may pose a human health hazard due to fecal coliform contamination, the potential for mosquito breeding areas, and transmission of diseases (e.g., encephalitis). In the short term, effects on the riparian habitat of the Tijuana River in these areas may be beneficial through the addition of supplemental water and nutrients. This condition could cause an increase in recruitment of riparian plants along the low-flow channel. However, it is doubtful that any habitat created will remain due to seasonal flood scour which recontours the low-flow channel annually. No impacts to federal endangered or threatened species are anticipated. No significant adverse impacts to terrestrial habitat or sensitive species are anticipated.

**Dioxin Analysis**

Consideration of dioxin does not change the analysis of effects in the 1996 SEIS; while these constituents may be present in the raw sewage, flows are expected to move through the river, the estuary and near shore marine environment and not affect terrestrial resources. Impacts, therefore, would remain less than significant.

**Acute Toxicity Analysis**

Without verification regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter may have significant affects to terrestrial resources in the river, the estuary and the near shore marine environment in the U.S.

**Mitigation**

Mitigation for impacts associated with acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

#### 4.3.2 Alternative 2 - Operate the SBIWTP

Under this alternative, raw sewage flows in excess of Pump Station One in Mexico (up to 25 mgd) would flow to the SBIWTP and would be treated to advanced primary standards. Advanced primary treated effluent would then be discharged to the Tijuana River. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los

Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

The advanced primary treatment process would remove up to 75 percent of the solids (organic matter), some level of the toxic elements (those levels absorbed to the solids, grease, and oil that are removed), and little if any nutrients. Potential effects to the riparian habitat of the river are expected to be the same as the No Action alternative, but at a much slower rate due to lower biological oxygen demand (BOD) and toxic elements. No significant adverse impacts to terrestrial habitat or sensitive species are anticipated. No mitigation measures in addition to commitments made in the previous EIS and Biological Opinion for the project are required.

**Dioxin Analysis**

Consideration of dioxin does not change the analysis of affects in the 1996 SEIS; while these constituents may be present in the treated effluent, flows are expected to move through the river, estuary and near shore marine environment and not affect terrestrial resources. Impacts, therefore, would remain less than significant.

**Acute Toxicity Analysis**

Without additional analysis regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter may have significant affects to terrestrial resources in the river and to the estuary and near shore marine environment in the U.S.

**Mitigation**

Mitigation for impacts associated with acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

**4.3.3 Alternative 5 - Operate SBIWTP with Discharge to SBOO**

Under this alternative, an average of 25 mgd (1,095 LPS) of raw sewage from Mexico would be treated to the advanced primary level at the SBIWTP and released to the SBOO for discharge to the ocean. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is expected to be substantially reduced.

**1996 SEIS Summary**

Under this alternative the SBIWTP would treat the sewage to advanced primary levels and discharge the effluent to the ocean via the South Bay Ocean Outfall. No impacts to the riparian habitat of the Tijuana River are expected from this alternative. No significant adverse impacts to terrestrial habitat or sensitive species are anticipated. No mitigation measures for this element of the project are required.

**Dioxin and Acute Toxicity Analysis**

Impacts associated dioxin and acute toxicity are consistent with the discussion in the 1996 SEIS for terrestrial resources.

**Mitigation**

Mitigation is not required as impacts are less than significant.

### 4.4 Estuarine Biology

This section describes the impacts from each of the alternatives to the biology of the Tijuana Estuary.

#### 4.4.1 Alternative 1 - No Action

The No Action Alternative requires a delay in operating the SBIWTP until the secondary treatment component is completed. Under this alternative, therefore, raw sewage flows in excess of the capacity of the Mexican collection and conveyance system and city of San Diego's emergency connection would flow into the Tijuana River. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

Impacts of raw sewage discharges to the Tijuana River estuary were identified as significant and adverse. Dry-weather sewage-contaminated flows would result in elevated pollutant loadings, eutrophication, and the reduction of salinity levels which could cause substantial adverse impacts to the biota in the estuary.

**Dioxin Analysis**

Dioxin found in the untreated sewage may have a significant adverse effect to biota within the Tijuana estuary. Dioxin is typically attached to solid particles in sewage. Thus, dioxin could be taken up by organisms coming into contact with solids or sediments associated with the sewage discharge.

Dioxin is not typically taken up by invertebrate organisms (Dioxin Appendix A); however, it is known to be taken up and bioaccumulate in fish coming in contact with sediments. (EPA, 1993). Effects of bioaccumulation in fish include toxicity and death, increased susceptibility to diseases, and reproductive anomalies. Further, accumulation in fish may allow for effects up the food chain, as predators ingest contaminated fish. Effects of raw sewage in the Tijuana estuary may therefore pose a significant impact to the biota within the estuary.

**Acute Toxicity Analysis**

Influent samples from Tijuana were collected and tested for acute toxicity; the influent was found to exceed acute toxicity standards. Therefore, the acute toxicity associated with a raw sewage discharge to the Tijuana River and estuary is considered to have a significant adverse impact to the biota within the Tijuana estuary.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

#### 4.4.2 Alternative 2 - Operate SBIWTP

Under this alternative, raw sewage flows in excess of Pump Station One in Mexico (up to 25 mgd) would flow to the SBIWTP and would be treated to advanced primary standards. Advanced primary treated effluent would then be discharged to the Tijuana river. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

Discharge of dry-season flows of treated effluent would have impacts to the estuary due primarily to nutrient loads. These flow volumes could induce eutrophication; and the seasonal high flows could reduce salinity levels and cause pollutant loadings that would affect species composition or abundance relative to current conditions. As with the No Action Alternative, prolonged exposure to freshwater and sewage constituents would likely continue or exacerbate the shifts in estuarine plants and animal communities documented in recent studies. Any discharge to the estuary of a point source that does not meet the receiving waters standards, such as advanced primary effluent, would be a significant impact.

EPA and USIBWC committed to conducting a monitoring program if treated effluent was routinely discharged during dry weather to the Tijuana River. The monitoring program would be initiated prior to discharge of the effluent and would continue through the period that effluent is discharged to the Tijuana River. Reports of the monitoring would be provided to the California Regional Water Quality Control Board, Tijuana River National Estuarine Research Reserve, and EPA.

**Dioxin Analysis**

Advanced primary treatment would cause an approximately 80% reduction in the levels of dioxin in the effluent, in comparison to raw sewage (Appendix A). However, dioxin could still be present in levels which exceed the Ocean Plan and NPDES permit requirements.

An Ecological Risk Assessment (ERA) was conducted to examine the effects of dioxin to the marine environment from a discharge of advanced primary effluent from the SBOO (Appendix A and Section 4.5.3). The ERA was used to examine the effects of an advanced primary effluent discharge to the Tijuana River and estuary.

Exposure Characterization. As discussed in Section 4.5.3, dioxin exposure is from either the advanced primary effluent or from the discharged, settleable solids associated with the effluent. Dioxin is primarily associated with the sedimenting solids, rather than the effluent. The adsorption of dioxin onto the solids was estimated to be 99.999% (EPA 1993).

Criteria for Characterizing Effects. There are no established regulatory criteria for the protection of marine or freshwater aquatic life from dioxin. The existing California Ocean Plan and EPA criteria were developed solely as protection for human health. Nevertheless, the existing literature on water and sediment-caused toxicity has been summarized in the EPA guidance manual on the assessment of dioxin risks to aquatic life and associated wildlife (EPA 1993). From this review, the most stringent criteria (lowest dioxin concentrations which could potentially affect marine organisms) were chosen as criteria in this assessment (Appendix A). Potential effects to biota including fish, birds, and aquatic invertebrates from exposure to advanced primary effluent and associated sediments released to the Tijuana River and estuary were examined.

River/Estuary Water. In consideration of the average dioxin concentration predicted, the advanced primary discharge to the Tijuana River would not exceed the chosen toxicity criteria (Table 11, Appendix A) for fish, aquatic invertebrates, or birds. However, in consideration of maximum dioxin concentrations, the risk criterion for birds would be exceeded. For birds, therefore, an exposure risk from waterborne dioxin in the Tijuana River and estuary (from the advanced primary discharge) does exist. This risk is considered significant.

River/Estuary Sediment. The estimated sediment concentration of dioxin associated with the advanced primary effluent is far below the risk level criteria (Table 11, Appendix A). Due to the dynamic nature of the river and estuary, sediments are not expected to accumulate in the river and estuary system. As such, there is no expected toxicity to, or significant bioaccumulation in, the biota in the river and estuary from dioxin concentrations in the sediment formed

from effluent solids. Despite this analysis, impacts from discharge of treated effluent to the Tijuana estuary remain significant, as discussed in the 1996 SEIS.

**Acute Toxicity Analysis**

Consistent with the discussion in Section 4.1.2, acute toxicity exceedances of the NPDES and Ocean Plan limits could result in adverse impacts to the estuarine environment and are therefore considered significant.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0. Consistent with the 1996 SEIS, monitoring of the river would be conducted for routine wastewater discharges to the river.

### 4.4.3 Alternative 5 - Operate SBIWTP with Discharge to SBOO

Under this alternative, an average of 25 mgd (1,095 LPS) of raw sewage from Mexico would be treated to the advanced primary level at the SBIWTP and released to the SBOO for discharge to the ocean. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is expected to be substantially reduced.

**1996 SEIS Summary**

Operating the SBIWTP and discharging treated effluent to the Pacific Ocean via the SBOO would eliminate the need to discharge to the Tijuana River. Therefore, no direct impacts to the estuary would result under this alternative. No mitigation measures for impacts to the estuary would be necessary.

**Dioxin and Acute Toxicity Analysis**

Impacts associated dioxin and acute toxicity are consistent with the discussion in the 1996 SEIS for estuarine resources; no mitigation is required.

## 4.5 Marine Biology

This section describes the biological impacts to the marine environment for each alternative.

### 4.5.1 Alternative 1 - No Action

The No Action Alternative requires a delay in operating the SBIWTP until the secondary treatment component is completed. Under this alternative, therefore, raw sewage flows in excess of the capacity of the Mexican collection and conveyance system would flow into the Tijuana River. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

The 1996 SEIS considered effects of a raw sewage river discharge to the marine environment including intertidal, benthic, and plankton communities, kelp beds, fish populations, marine mammals and marine birds. Significant and adverse marine biological impacts were assessed for the No Action Alternative due to the continued and increasing amount of sewage from Tijuana, polluting waters and beaches in the United States. The effects of these discharges are already reflected in existing conditions, however, due to the preceding years of chronic flows of sewage. Any

adverse changes due to the increases in volume of sewage flow would be incremental. Adverse impacts to marine biota from a shoreline discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility would continue. Under the No Action Alternative, mitigation was not identified in the 1996 SEIS.

**Dioxin Analysis**

Releases of raw sewage to the Tijuana River may result in the introduction of dioxin to the near shore marine environment. The primary effect of dioxin could be the bioaccumulation in fish species, particularly in the estuary, as well as demersal fish located along the coast. This pollutant could transfer up the foodchain; near shore fish, marine mammals, and marine birds could be adversely affected by the ingestion of contaminated fish. Effects of bioaccumulation within a particular organism include toxicity and death, increased susceptibility to disease, and reproductive anomalies. Fish populations in the estuary and demersal (bottom dwelling) fish along the coast may be more significantly affected by the sewage contamination than pelagic fish which are more wide ranging. Dioxin is not known to bioaccumulate in marine invertebrates, therefore, species living off this type of prey would not experience bioaccumulation. Impacts from dioxin may be significant to the marine environment due to the potential bioaccumulation in fish populations. Impacts from dioxin in the Mexican discharge at the surf adjacent to San Antonio de los Buenos Wastewater Treatment Facility is not anticipated to significantly affect U.S. waters due to the low levels of dioxin present in the discharge and the high dilution provided by the ocean currents.

**Acute Toxicity Analysis**

Mexican influent samples were collected and tested for acute toxicity; the influent was found to exceed acute toxicity limits. Impacts from acute toxicity associated with a raw sewage discharge are consistent with those described in the 1996 SEIS. Impacts from sewage, in terms of acute toxicity, are considered significant to the marine environment. Adverse impacts to marine biota from a shoreline discharge near San Antonio de los Buenos Wastewater Treatment Facility in Mexico would continue.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

### 4.5.2 Alternative 2 - Operate the SBIWTP

Under this alternative, raw sewage flows in excess of Pump Station One in Mexico (up to 25 mgd [1,095 LPS]) would flow to the SBIWTP and would be treated to advanced primary standards. Advanced primary treated effluent would then be discharged to the Tijuana river. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

The discharge of treated effluent as opposed to untreated sewage in the Tijuana river could reduce impacts to the intertidal and benthic communities, fish, and shorebirds around the mouth of the Tijuana River. Hence, impacts are anticipated to be somewhat beneficial relative to the No Action Alternative. Localized adverse impacts to intertidal and benthic communities, fish, and shorebirds around the mouth of the Tijuana River would remain, however. Impacts along the coastline in Mexico would be substantially adverse and the same as for the No Action Alternative. No mitigation measures are available to address the effects to marine biota from the discharge of treated effluent to the Tijuana River. Mitigation is not available for the residual effects of the discharges in Mexico on the intertidal and benthic communities, as well as shorebirds. These existing effects are considered significant and unmitigated.

**Dioxin Analysis**

Near shore Ocean Water. As discussed in Section 4.4.2, average effluent dioxin concentrations would not pose a risk to biota in the river and estuary, while maximum dioxin concentrations would pose a risk to birds. After traveling through the river and estuary, the effluent would mix in the surf zone and be diluted in the Pacific Ocean. Despite dilution, maximum effluent dioxin concentrations may still pose a risk for birds. This risk is considered significant.

Near shore Ocean Sediments. As discussed in Section 4.4.2, the estimated sediment concentration of dioxin associated with the advanced primary effluent is far below the risk level criteria (Table 11 , Appendix A). As such, there is no expected affect to, or significant bioaccumulation in, the biota in the near shore ocean environment from dioxin concentrations in the sediment formed from effluent solids. Impacts from discharge of treated effluent to the marine environment would remain significant, however, as discussed in the 1996 SEIS.

**Acute Toxicity Analysis**

As discussed in Section 4.1.2, additional testing of SBIWTP effluent indicates the effluent exceeded acute toxicity limits. Acute toxicity exceedances of the NPDES and Ocean Plan limits could result in adverse impacts to the marine environment and are therefore considered significant. Acute toxicity testing of Mexican influent has also been completed; the influent was also found to exhibit high levels of acute toxicity. In light of the new information on acute toxicity, impacts from a Mexican shoreline discharge near the San Antonio de los Buenos Wastewater Treatment Facility of treated and untreated wastewater would remain significant.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

**4.5.3 Alternative 5 - Operate the SBIWTP** with **Discharge to the SBOO**

Under this alternative, an average of 25 mgd (1,095 LPS) of raw sewage from Mexico would be treated to the advanced primary level at the SBIWTP and released to the SBOO for discharge to the ocean. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility s expected to be substantially reduced.

**1996 SEIS Summary**

In U.S. waters, impacts to the intertidal and benthic communities, fish, and marine mammals due to discharges from the ocean outfall would not be significant. Impacts to the intertidal and benthic communities, as well as shorebirds in Mexico, (from the shoreline discharge in Mexico) are adverse and potentially significant. However, the magnitude of these impacts is anticipated to be less than would occur with the No Action Alternative due to the reduced flows of untreated sewage discharged to the shoreline. This is a beneficial impact relative to existing or future conditions under the No Action Alternative. Mitigation for impacts to marine life in U.S. waters is not necessary for this alternative. The effects of the discharges from the ocean outfall on the benthic communities and marine mammals are not anticipated to be significantly adverse.

As part of the NPDES permit for the outfall discharge, a comprehensive baseline monitoring program has been initiated and will continue during the period of the interim discharge. This program will monitor sediments, benthos, water quality, fish, and the Imperial Beach kelp bed. If significant changes were to occur, the monitoring program would identify problems and the discharge would be required to be modified to conform to the Ocean Plan or other requirements. Mitigation for impacts to marine life in Mexico from discharges of untreated effluent near the San

Antonio de los Buenos Wastewater Treatment Facility is the responsibility of Mexico.

**Dioxin Analysis**

An ecological risk assessment (ERA) was performed using the average predicted effluent concentration for dioxin for the advanced primary treatment process (Appendix A). This ERA is consistent with the ERA conducted for the 1996 SEIS and presented in Appendix D of that document; the only change is that the compound dioxin has been added to the list of identified contaminants. The results of the revised ERA are provided here.

Exposure Characterization. For the advanced primary treatment process, dioxin exposure is characterized for two scenarios: for the predicted average effluent concentration in the ocean following the permitted 100:1 dilution, and for the discharged solids that settle near the diffuser. The estimated dioxin concentration in the settling and sedimenting solids was calculated using the formula presented in Appendix D, Section 3.1 (1996 SEIS). The adsorption of dioxin onto the solids was estimated to be 99.999% (EPA 1993).

Criteria for Characterizing Effects. There are no established regulatory criteria for the protection of marine or freshwater aquatic life from dioxin. The existing California Ocean Plan and EPA criteria were developed solely as protection for human health. Nevertheless, the existing literature on water and sediment-caused toxicity has been summarized in the EPA guidance manual on the assessment of dioxin risks to aquatic life and associated wildlife (EPA 1993). From this review, the most stringent criteria (lowest dioxin concentrations which could potentially affect marine organisms) were chosen as criteria in this assessment (Appendix A). Potential effects to marine biota including fish**,** birds, and aquatic invertebrates from exposure to ocean water and ocean sediments were examined.

Ocean Water. In consideration of the maximum dioxin concentration predicted, the advanced primary discharge after 100:1 dilution would not exceed the chosen toxicity criteria (Table 11 , Appendix A). There does not appear to be a risk of exposure from waterborne dioxin to the marine environment through the discharge of advanced primary effluent from the SBOO.

Ocean Sediment. The estimated sediment concentration of dioxin from the advanced primary discharge from the SBOO is far below the risk level criteria (Table 11 , Appendix A). There is no expected toxicity to, or significant bioaccumulation in, marine organisms from dioxin concentrations in the sediment formed from effluent solids. Dioxin does not present additional risk to the marine environment from the advanced primary discharge of effluent from the SBOO.

**Acute Toxicity Analysis**

Advanced primary effluent has been found to exceed various acute toxicity standards. Acute toxicity is used to estimate the aggregate toxic effect (i.e., lethality) of an effluent using standardized, surrogate freshwater vertebrates or invertebrates. It is unclear how acute toxicity would affect the marine environment after a 100:1 initial dilution from the SBOO. Acute toxicity tests in the laboratory do not allow for the 100:1 dilution received at the discharge point. In addition, acute toxicity testing is done on freshwater organisms, which may not be truly representative of the organisms characteristic of the marine environment surrounding the outfall. Nevertheless, exceedances of the acute toxicity test are considered significant and could potentially harm marine organisms around the SBOO. Furthermore, without verification regarding the cause of the acute toxicity, impacts from the exceedance of the acute toxicity parameter from the discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Plant may have significant affects to U.S. waters.

## Mitigation

Impacts from release of dioxin from SBOO are not anticipated to be significant; mitigation is not required. Impacts associated with acute toxicity can only be mitigated by a source identification and pretreatment program, as well as

by secondary treatment facilities at the SBIWTP. A discussion of the development of a pretreatment program is included in the Environmental Commitments Section 5.0.

### 4.6 Public Health

This section evaluates impacts from vectors for each of the alternatives. The issue of human health effects of dioxin and acute toxicity are also addressed here. The issue of pathogens (bacteria) as human health risks is discussed in the Hydrology and Water Quality Section and the Oceanography Section.

#### 4.6.1 Alternative 1 - No Action

The No Action Alternative requires a delay in operating the SBIWTP until the secondary treatment component is completed. Under this alternative, therefore, raw sewage flows in excess of the capacity of the Mexican collection and conveyance system would flow into the Tijuana River. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is also expected to continue.

**1996 SEIS Summary**

Dry weather sewage flows in the Tijuana River could result in ponding of surface water in the river low-flow channel. The presence of dry-weather flows historically has caused a mosquito and vector-borne disease potential. The potential for significant impacts to human health due to mosquito breeding would exist as the sewage flows from Tijuana increase and chronic dry-weather flows occur in the river. Limited monitoring data and modeling by Parsons Engineering Science indicate that the discharge near the San Antonio de los Buenos Wastewater Treatment Facility could periodically cause contamination of some U.S. beaches. Several mitigation measures were proposed to address these impacts. In coordination with the County of San Diego, dry-weather flows to the river should be monitored to ensure that no ponding of effluent occurs that could provide breeding areas for mosquitoes. If ponding does occur, the area should be drained or modified to return flowing water conditions. Stocking of ponded areas that cannot be drained with mosquito fish would also reduce impacts from this alternative. Mitigation is not available for impacts associated with a shoreline discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility.

**Dioxin Analysis**

The presence of dioxin could have significant effects on human health. In terms of dioxin, there is the potential for human exposure to dioxin from ingestion of fish (which have been exposed to raw sewage) caught within the Tijuana estuary and nearshore area of the Tijuana River. Human consumption of dioxin contaminated fish could result in adverse health effects to humans. Dioxin may cause a variety of adverse responses both after short and long term exposure including adverse effects to the human immune and reproductive systems as well as posing a cancer risk.

**Acute Toxicity Analysis**

Acute toxicity is used to estimate the aggregate toxic effect (i.e., lethality) of an effluent using standardized, surrogate freshwater vertebrates or invertebrates; it does not protect for public health. To identify effects to humans, an analysis would need to be done to determine the specific chemicals causing acute toxicity exceedances and a health risk assessment would need to be completed for these chemicals to determine the specific effects on humans. With the absence of this specific data, it should be assumed that adverse effects may occur to humans who come in direct contact with sewage in the Tijuana River, estuary, or nearshore ocean environment.

**Mitigation**

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification

and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

### 4.6.2 Alternative 2 - Operate the SBIWTP

Under this alternative, raw sewage flows in excess of Pump Station One in Mexico (up to 25 mgd) would flow to the SBIWTP and would be treated to advanced primary standards. Advanced primary treated effluent would then be discharged to the Tijuana River. Raw sewage discharge to the surf zone in Mexico is also expected to continue.

#### 1996 SEIS Summary

The discharge of advanced primary effluent to the Tijuana River would not significantly reduce health risks to residents in the valley from bacterial contamination or vectors. The effluent could provide mosquito breeding habitat by ponding in the river channel. Impacts would be similar to the No Action Alternative. Discharge of advanced primary effluent to the Tijuana River would result in significant human health risks from pathogens, including disease vectors. The discharges to the river should be monitored to ensure that no ponding of effluent occurs that could provide breeding areas for mosquitoes. If ponding does occur, the area should be drained or modified to return flowing water conditions. Stocking of ponded areas that cannot be drained with mosquito fish would also reduce impacts from this alternative. Limited monitoring data and modeling by Parsons Engineering Science indicate that the discharge from the Mexican treatment plant could periodically cause contamination of some U.S. beaches.

#### Dioxin Analysis

In consideration of the average dioxin concentration predicted, the advanced primary discharge to the Tijuana River would not exceed the chosen toxicity criteria (Table 11 , Appendix A) for fish, aquatic invertebrates, or birds. However, in consideration of maximum dioxin concentrations, the risk criterion for birds would be exceeded. For birds, therefore, an exposure risk from waterborne dioxin in the Tijuana River and estuary (from the advanced primary discharge) does exist. This risk is considered significant. The estimated sediment concentration of dioxin associated with the advanced primary effluent is far below the risk level criteria (Table 11 , Appendix A). As such, there is no expected toxicity to**,** or significant bioaccumulation in, the biota in the river and estuary from dioxin concentrations in the sediment formed from effluent solids. Therefore, effects to humans coming into contact with organisms exposed to the advanced primary discharge would not be significant.

Dioxin concentrations in sludge were estimated for the average and maximum influent concentrations for the advanced primary treatment process. See Table 4 of Appendix A for the projected dioxin concentrations in sludge for the activated sludge process. Based on projected removal efficiencies and compared with California Title 22 regulatory standards, the advanced primary treatment process is not predicted to produce hazardous sludge. Therefore, worker exposure to sludge generated by the advanced primary treatment process would not be a significant public health hazard.

#### Acute Toxicity Analysis

Acute toxicity is used to estimate the aggregate toxic effect (i.e., lethality) of an effluent using standardized, surrogate freshwater vertebrates or invertebrates; it does not protect for public health. To identify effects to humans, an analysis would need to be done to determine the specific chemicals causing acute toxicity exceedances and a health risk assessment would need to be completed for these chemicals to determine the specific effects on humans. With the absence of this specific data, it should be assumed that adverse effects may occur to humans who come in direct contact with advanced primary effluent in the Tijuana River, estuary, or nearshore ocean environment.

#### Mitigation

Mitigation for impacts associated with acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

### 4.6.3 Alternative 5 - Operate SBIWTP with Discharge to SBOO

Under this alternative, an average of 25 mgd (1,095 LPS) of raw sewage from Mexico would be treated to the advanced primary level at the SBIWTP and released to the SBOO for discharge to the ocean. Raw sewage discharge to the surf zone in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is expected to be substantially reduced.

#### 1996 SEIS Summary

Public health impacts in the Tijuana River Valley (pathogens and mosquitoes) and at southern San Diego beaches (pathogens) would not result from any effluent discharges from the South Bay Ocean Outfall. Discharge of treated and untreated sewage to the shoreline in Mexico, along with associated impacts, would still occur. Impacts from the shoreline discharge in Mexico are considered potentially significant. Mitigation for impacts resulting from the shoreline discharge in Mexico near the San Antonio de los Buenos Wastewater Treatment Facility is not available.

#### Dioxin Analysis

Due to the depth of discharge and the dilution provided, dioxin should have no significant impacts on human health. Further, the Ecological Risk Assessment (Appendix A) which examined the issue of dioxin and effects to the marine environment determined there would be no expected toxicity to or bioaccumulation in marine organisms from dioxin concentrations in the sediment formed from effluent solids or waterborne dioxin in the effluent. As such, effects to humans coming into contact with organisms exposed to the SBOO discharge would not be significant.

Dioxin concentrations in sludge were estimated for the average and maximum influent concentrations for the advanced primary treatment process. See Table 4 of the Appendix A for the projected dioxin concentrations in sludge for the activated sludge process. Based on projected removal efficiencies and compared with California Title 22 regulatory standards, the advanced primary treatment process is not predicted to produce hazardous sludge. Therefore, worker exposure to sludge generated by the advanced primary treatment process would not be a significant public health hazard.

#### Acute Toxicity Analysis

Acute toxicity is used to estimate the aggregate toxic effect (i.e., lethality) of an effluent using standardized, surrogate freshwater vertebrates or invertebrates; it does not protect for public health. To identify effects to humans, an analysis would need to be done to determine the specific chemicals causing acute toxicity exceedances and a health risk assessment would need to be completed for these chemicals to determine the specific effects on humans. With the absence of this specific data, it should be assumed that adverse effects may occur to humans who come in direct contact with advanced primary effluent released from the SBOO. Due to the depth of discharge and the dilution provided by the ocean, this exposure to effluent is minimized.

#### Mitigation

Mitigation for impacts associated with dioxin and acute toxicity consists of the development of a source identification and pretreatment program in Tijuana, as well as the completion of secondary treatment facilities at the SBIWTP. Further discussion of mitigation measures is included in the Environmental Commitments Section 5.0.

**4.7 Cumulative Effects**

Cumulative effects remain consistent with the discussion provided in the 1996 SEIS.

**4.8 Effects Not Reevaluated for this Supplement**

No additional significant impacts will occur in terms of geological resources, air quality and odors, land use and socioeconomic resources. Therefore, these resources are not further discussed in the Supplement.

**5.0 Environmental Commitments**

**5.1 Pretreatment Program**

The objective of a pretreatment program in Tijuana is essentially the same as a United States pretreatment program. It is to require waste generators to treat wastes before discharge to the sewer system and in order to produce an effluent that will not disrupt wastewater treatment or cause detrimental effects on the downstream ecosystem.

On July 2, 1990 Mexico and the United States signed USIBWC Treaty Minute No. 283 titled Conceptual Plan for the International Solution to the Border Sanitation Problem in San Diego. California/Tijuana, Baja California. Minute 283 states "The Government of Mexico in accordance with laws in force in that country, in order to assure efficient treatment of Tijuana sewage in the international plant, will require all industries to provide appropriate pretreatment of wastewater that those industries may discharge into the Tijuana sewage collection system which would in turn discharge into the international sewage treatment plant." USIBWC is currently working with Mexico to establish a pretreatment program similar to those implemented in the United States.

Furthermore, in March of 1997, the Direccion General de Ecologia of Baja California, the City of San Diego, and the San Diego Regional Water Quality Control Board reached agreement on a three year program of technical assistance for the industrial wastewater pretreatment program in Tijuana. The purpose of this program was to ensure that the NPDES permit limits set forth for the SBIWTP will be met. The program includes sampling and analysis of Tijuana wastewater and provisions for laboratory equipment. In addition, the program includes a "shadow training program" involving up to five training days per month for industrial wastewater personnel from Tijuana by the City of San Diego staff. Training topics to date have included wastewater monitoring and industrial facility inspection. The first phases of the program have been completed and a new agreement has been reached to expand the program for an additional 18 months with funding of up to $1 million from the State of California. The new program will include:

1. Classroom and "hands on training" that involves classes and field training for industrial wastewater personnel in the Tijuana area.

2. Implementation of a comprehensive sampling and analysis program consisting of monitoring program of four fixed or stationary monitoring stations and two "floating" stations to monitor Tijuana wastewater for industrial constituents. Wastewater analysis assistance would be provided by City of San Diego laboratories. This effort builds upon the first phase of the program, and is intended to provide representative information on industrial wastewater discharge to the Tijuana wastewater collection system.

3. Development of written industrial wastewater monitoring and pretreatment training manuals customized for use in Tijuana to enhance existing industrial wastewater assistance efforts.

The development of a pretreatment program will aid in reducing the sources of the acute toxicity and dioxin and prevent new sources from developing.

**5.2 Toxicity Reduction Evaluation**

Since the initiation of testing of the SBIWTP, effluent quality has not met the acute toxicity limit as required in the SBIWTP's NPDES permit. When an effluent is demonstrated to be acutely toxic, a Toxicity Reduction Evaluation (TRE) must be initiated. The first phase of the TRE is the completion of a Toxicity Identification Evaluation (TIE) performed to measure the variability and persistence of the toxicants in the treated effluent that are causing toxicity to test species.

In March of 1998, the USIBWC and EPA initiated an accelerated TRE to identify the cause of the acute toxicity. All of the effluent samples collected at the SBIWTP have been found to exceed NPDES permit limits for acute toxicity. Acute toxicity testing was also completed during three time periods (May, June, and July 1998) on the Tijuana influent. Acute toxicity limits were exceeded for all of the influent samples collected. The results of an accelerated TIE initiated in March 1998 were inconclusive regarding the cause of the toxicity.

On June 16, 1998, a comprehensive TIE was initiated to identify the source of the IWTP effluent toxicity. Three sampling events were completed for Phase 1 of the TIE (June, July and August 1998). Each sample indicated the presence of organic toxins, specifically surfactants, as the source of the toxicity. Surfactants are typically found in foaming agents in detergents used in domestic or industrial uses.

Phase II of the TIE used various analyses to further clarify and confirm the source of the toxicity. Although surfactants were again found to be the primary source of the acute toxicity, other compounds such as diazinon and carbofuran may also be a cause of the toxicity but masked by the surfactants. Phase II of the TIE will be finalized by October 31, 1998 and a report will be issued subsequently. Outline of the draft TIE results are included in Appendix E in this Supplement. These results were presented by Pacific EcoRisk Laboratories to EPA and USIBWC at a meeting on October 14, 1998 (Appendix E).

### 5.3 Secondary Treatment

In January 1998, EPA and the USIBWC issued the Draft Long Term Treatment Options Supplemental Environmental Impact Statement which examined long term treatment options for the SBIWTP including remaining at the advanced primary level or constructing secondary treatment technologies. After reviewing the analysis completed in the Draft Long Term Treatment Options SEIS and receiving public comment on the document, EPA and the USIBWC have committed to constructing secondary treatment facilities at the SBIWTP. Secondary treatment at the SBIWTP will significantly aid in reducing the toxicity caused by surfactants. Also, as reported in the 1998 Dioxin Report (Appendix A), dioxin levels would be substantially reduced through secondary treatment. Completion of the Long Term Treatment Options SEIS is anticipated in the Spring of 1999.

## 6.0 Compliance with Laws and Regulations

### 6.1 National Environmental Policy Act

This Supplement was prepared to address the issues of acute toxicity and dioxin in wastewater treated by the SBIWTP. In order to utilize the ocean outfall when it becomes available in December, EPA and USIBWC sought a deviation (40 CFR 6.106) from EPA's NEPA regulations (40 CFR 6.404) which requires a supplement to be prepared in accordance with the procedures for an EIS which would require circulation of a draft SEIS for 45 days and a final SEIS for 30 days. In lieu of those procedures the agencies proposed to prepare the Supplement to update the 1996 SEIS on impacts from acute toxicity and dioxin; notice the Supplement in the Federal Register, and circulate the Supplement for a 30 day public comment period. At the end of the comment period, the lead agencies would issue a revised Record of Decision that would reevaluate the decision to operate the plant and discharge through the ocean outfall. The Council on Environmental Quality was consulted regarding this process.

### 6.2 Clean Water Act

Section 402 of the Clean Water Act establishes the National Pollutant Discharge Elimination System permitting program. All point source dischargers are required to obtain and comply with the provisions of an NPDES permit for any discharge of pollutants into waters of the U.S. (e.g., oceans, lakes, or streams). Discharge of primary treated effluent to the ocean is not authorized by the federal Clean Water Act. In addition, discharges of treated effluent to the Tijuana River and estuary would not comply with the Clean Water Act. If a discharge is to occur, the discharger will comply with a discharge permit and compliance order issued by the RWQCB. The RWQCB issued an NPDES permit (Order No. 96-50, Permit No. 0108928) along with a Cease and Desist Order (No. 96-52) for the SBIWTP. The NPDES permit contains effluent limitations based on the Ocean Plan and other applicable standards. The RWQCB modified the Cease and Desist Order on October 14,1998 to include a schedule for compliance with acute toxicity requirements within 18 months (Appendix F).

**6.3 Endangered Species Act**

Potential impacts to federal listed species requires consultation with the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS), as stated under Section 7 of the federal Endangered Species Act. If the USFWS or NMFS advises a federal agency that a listed species may be present in the area of a proposed agency action, the agency must conduct a biological assessment to determine whether its proposal is likely to affect any listed species. If the assessment concludes that a protected species may be adversely affected, the agency must initiate formal consultation with USFWS or NMFS. Based upon the results of the formal consultation, USFWS or NMFS must issue a written biological opinion. Informal consultation has been initiated by EPA and USIBWC with the USFWS, along with a letter to the USFWS on the issues of dioxin and acute toxicity. It was the USFWS preliminary opinion that the new data did not require reinitiation of a Section 7 consultation under the federal Endangered Species Act.

**6.4 Coastal Zone Management Act**

In December 1996, the Coastal Commission concurred with the consistency determination (CD-137-96), which concluded that the interim operation of the SBIWTP was consistent to the maximum extent practicable with the California Coastal Management Program (CCMP). The studies presented in the 1996 SEIS predicted that the advanced primary effluent would meet California Ocean Plan standards, except for one group of constituents, polynuclear aromatic hydrocarbons. Despite this potential exceedance of the Ocean Plan, the project was determined to be consistent with the CCMP since it would result in net benefits to coastal resources through the reduction of both dry weather sewage flows in the Tijuana River and raw sewage discharges to the surf zone in Mexico. Operation of the SBIWTP was also determined to result in improvements to habitat within the river, estuary, and nearshore waters and also in improved recreational opportunities by the reduction of beach closures, odor, and mosquito populations.

EPA and USIBWC have determined that the presence of acute toxicity and dioxin in Tijuana wastewater does not significantly change the findings of the 1996 Consistency Determination. Despite the presence of these two constituents the project exhibits the previously described net benefits. The USIBWC submitted a Negative Determination on the issues of acute toxicity and dioxin, as they relate to the SBOO discharge, to the Coastal Commission in September (Appendix C). These issues are to be considered by the Commission at their November meeting.

**7.0 Consultation with Others**

An ongoing program of coordination with interested individuals, groups, and agencies has been conducted by EPA and USIBWC for the SBIWTP and SBOO project. Information meetings have been held on a monthly basis.

The dioxin and acute toxicity issues were discussed at two public meeting in San Diego on August 10 and September 22, 1998. Attendees at these meeting included various members of the public (Citizens Revolting Against Pollution, Tijuana Valley Equestrian Association, and Citizens Against Recreational Eviction), environmental advocate groups (Surfrider Association and Sierra Club), political representatives (Congressman Filner and Bilbray and the Cities of San Diego and Imperial Beach) and public agencies (Tia Juana Valley County Water District, County of San Diego, Department of Environmental Health and City of San Diego Municipal Wastewater Department).

In addition, several agencies including the U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Coastal Commission, and California Department of Fish and Game were coordinated with via telephone and letter.

Supplement Distribution. This Supplement to the 1996 SEIS was sent to the public for a thirty day review.
A mail-distribution list for this document can be found in Appendix B.

**8.0 List of Preparers**

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International Boundary and Water Commission, U.S. Section - Charles Fischer

## 9.0 References Cited


**City of San Diego**

1994 and 1995 Regional Ocean Monitoring Report: Ocean Monitoring Program, Metropolitan Wastewater Department, Environmental Monitoring and Technical Services Division.

1995 and 1996 International Wastewater Treatment Plant Baseline Ocean Monitoring Report: Ocean Monitoring Program, Environmental Monitoring and Technical Services Division.

1996 and 1997 International Wastewater Treatment Plant Baseline Ocean Monitoring Report: Ocean Monitoring Program, Environmental Monitoring and Technical Services Division.

**EPA**

Dioxin Reassessed: A General Overview. See www.envirolink.org/action/news/diox/dioxin.html

1993 Interim Report on Data and Methods for Assessment of 2,3,7,8-Tetrachlorodibenzo-p-dioxin Risks to Aquatic Life and Associated Wildlife. March.

**RECON**

1996 Final Supplemental Environmental Impact Statement, International Boundary and Water Commission International Wastewater Treatment Plant Interim Operation. Prepared for USIBWC AND EPA. November.

# FIGURES

Prepared by

U.S. Army Corps of Engineers
Los Angeles District

October 1998

APPENDIX B

# SUPPLEMENT DISTRIBUTION LIST

Prepared By

U.S. Army Corps of Engineers
Los Angeles District

October 1998

The EPA published a Notice of Availability of this Supplement to the 1996 SEIS in the Federal Register on October 30, 1998. Copies of the Supplement were made available in local libraries or through the San Diego office of the USIBWC or the U.S. Army Corps of Engineers. Copies of the Supplement were sent to the following persons,

organizations, and agencies:

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Senator Barbara Boxer, U.S. Senate
Senator Dianne Feinstein, U.S. Senate
Congressman Randy Cunningham, U.S. House of Representatives, District 51
Congressman Bob Filner, U.S. House of Representatives, District 49
Congressman Duncan Hunter, U.S. House of Representatives, District 52
Congressman Ron Packard, U.S. House of Representatives, District 48
Congressman Brian Bilbray, U.S. House of Representatives, District 49
Governor Pete Wilson
Senator Bill Craven, California State Senate
Senator, David Kelley, California State Senate, District 37
Senator Lucy Killea, California State Senate, District 39
Senator Steve Peace, California State Senate, District 40
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City of Chula Vista

City of Imperial Beach

City of National City

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Mayor Susan Golding
City Manager
Mr. Larry Monserrate, Principal Planner, Development Services Department
Mr. Geoffrey Bogart, Binational Affairs
Mr. Dave Schlesinger, Metropolitan Wastewater Department
Mr. Leonard Wilson, Water Utilities Dept.
City of San Ysidro, Chamber of Commerce
San Diego Department of Environmental Health
San Diego Unified Port District
Mr. Ralph Hicks, Environmental Management Coordinator

**PRIVATE INTEREST GROUPS**

Aqualogic, Mr. Allyn Feinberg
Audubon Society, San Diego Chapter, Mr. Jim Peugh
Border Community Town Council
Calmat
California-American Water Company
California Native Plant Society, San Diego Chapter
California United Mexican Americans, Mr. Alberto R. Garcia
Centers for Disease Control, Special Programs Group
CH2M Hill
Citizens Against Recreational Eviction, Ms. Carolyn Powers
Citizens Coordinate for Century 3
Citizens Against Pollution, Ms. Rosemary Nolan, Chairperson
DeTreville Environmental Engineering
Eco Resources, Inc.
Environmental Chemical Corp.
Environmental Health Coalition
Friends of South Bay Wildlife
Otay Mesa/Nestor Community Planning Group, Ms. Ruth J. Schneider
Otay Mesa Recreation Council, Mr. Val Guerra
Otay Water District, Mr. Keith Lewinger, General Manager
Pacific Estuarine Research Lab
Pacific Institute, Mr. Santos Gomez
Parsons Engineering Science, Mr. Luciano Meiorin
Proyecto Fronterizo de Education Ambiental A.C.
San Diego Bay Coalition
San Diego Council of Divers, Inc., Mr. Lee Olson, President
San Ysidro Community Planning Group, Ms. Mirna Pere
San Diego Bay Keepers
Sierra Club, San Diego Chapter

Sierra Club Legal Defense Fund, Mr. Larry Silver
Southwest Wetlands Interpretative Association, Mr. Larry Kadlecik
Surfrider Foundation, San Diego Chapter

**INTERESTED INDIVIDUALS**

Nelson and Sloan Contractor, Mr. Ken Monson
Swanson Oswald Associates, Mr. Edwin W. Lee
Mr. William E. Claycomb
Mr. Alejandro Flores
Mr. Wendell Gayman
Mr. Monty Griffin
Ms. Rachel Hanlon
Mr. Ken Jackman
Mr. Robert Simmons

**PUBLIC LIBRARIES**

Central Library, Reference Section
Chula Vista Library, Reference Section
Coronado Library, Reference Section
Imperial Beach Library, Reference Section
National City Library, Reference Section
Otay Mesa Branch Library, Reference Section
San Ysidro Library, Reference Section

APPENDIX C

CORRESPONDENCE

Prepared By

U.S. Army Corps of Engineers
Los Angeles District

October 1998